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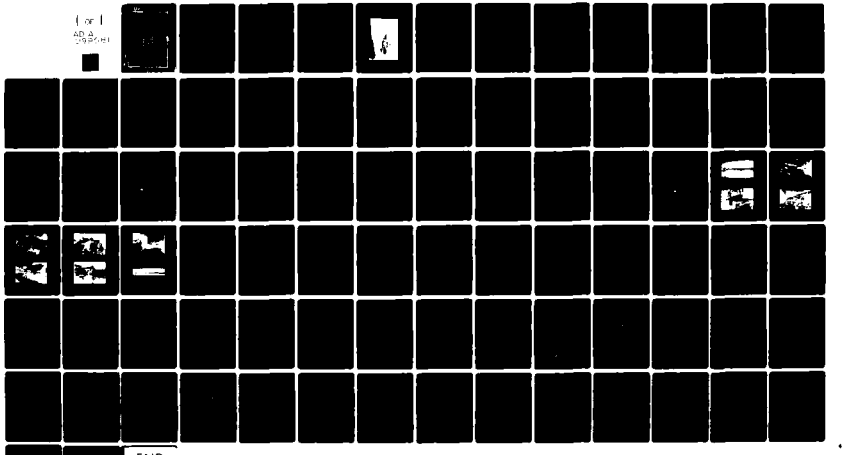

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POTOMAC RIVER BASIN

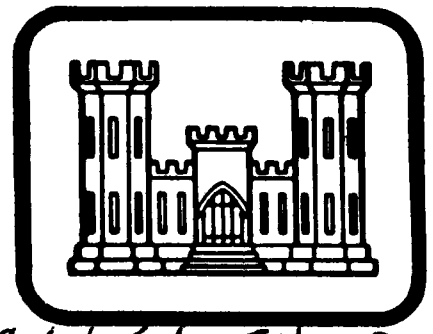
CARBAUGH RUN DAM

SOUTH MOUNTAIN RESTORATION CENTER

NDI NO. PA-00881
DER NO. I-077

ADAMS COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DACW31-81-C-0083

PREPARED FOR

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

BY
Berger Associates
Harrisburg, Pennsylvania 17105

APRIL 1981

81 5 18 035

PREFACE

This report has been prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam: CARBAUGH RUN DAM

State & State No.: PENNSYLVANIA, 1-077

County: ADAMS

Stream: CARBAUGH RUN

Date of Inspection: October 10, 1980

Based on the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in good condition.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. The recommended SDF for this water supply structure is one-half the PMF. The spillway capacity is sufficient for passing 45 percent of the PMF peak inflow without overtopping the dam at its present low point. The spillway, therefore, is considered to be inadequate, but not seriously inadequate.

The following recommendations are presented for immediate action by the owner:

1. That the crest of the embankment be raised to its design crest elevation of 1331.0 over its full length to make the spillway capacity adequate to pass the SDF.

2. That a positive outlet be provided for the toe drain near the end of the stilling basin.

3. That the seepage condition at the downstream toe be monitored on a regular basis. If an increase in quantity or turbidity is detected, immediate steps shall be taken to correct this condition.

4. That the joint of the right stilling basin wall be repaired and sealed from both sides.

5. That all brush and high weeds be removed from the embankment on an annual basis.

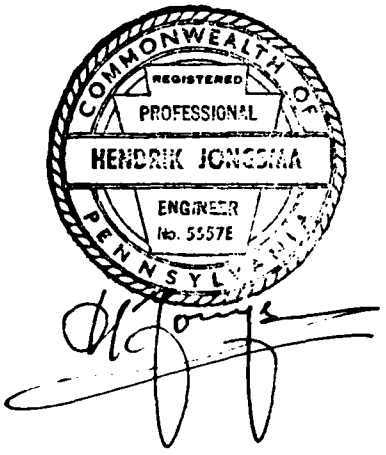
6. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.

7. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

SUBMITTED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

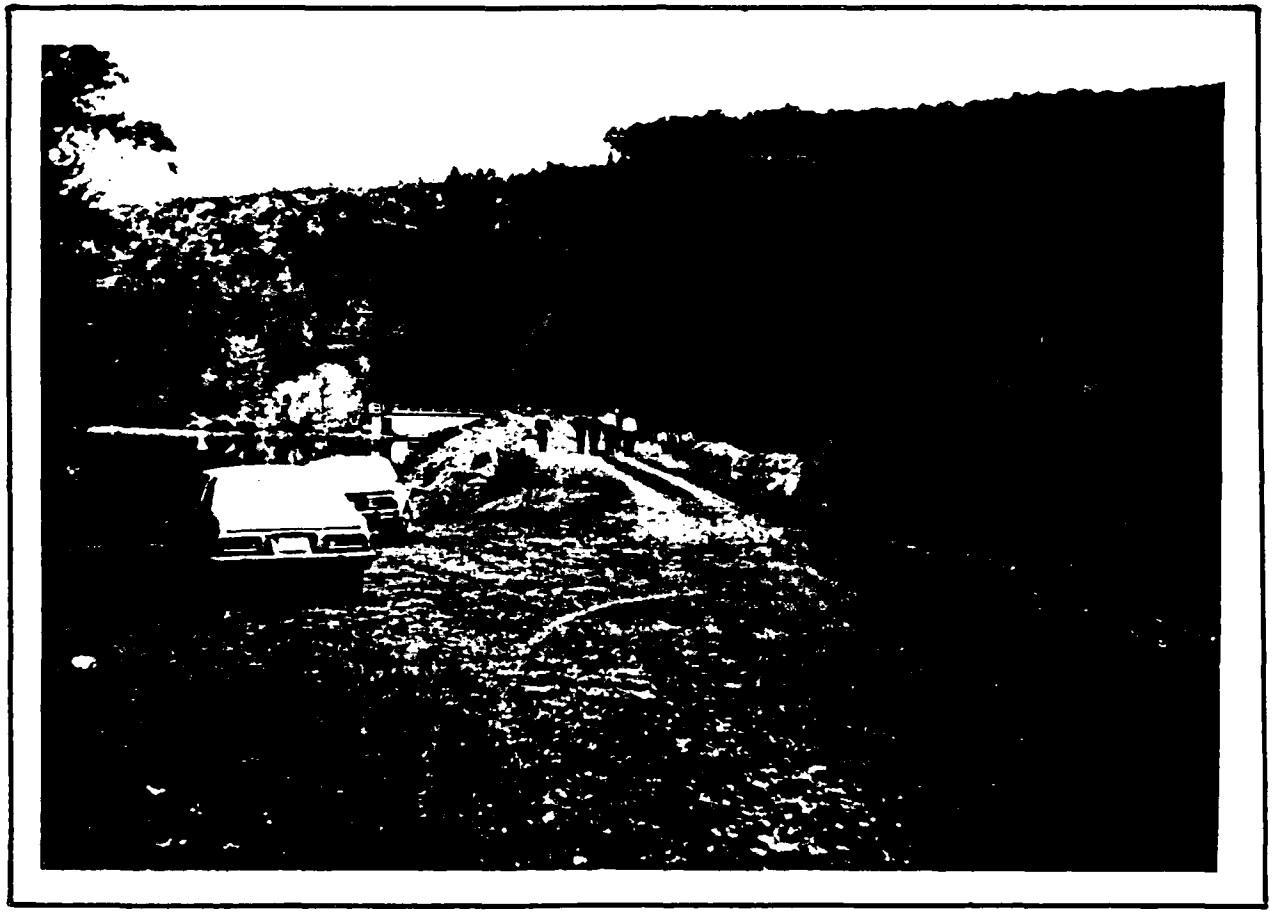
DATE: April 3, 1981



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

DATE: 22 APR 81



OVERVIEW

CARBAUGH RUN DAM

Photograph No. 1

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

CARBAUGH RUN DAM

NDI No. PA-00881
DER No. 1-077

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

A. Authority

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspections of dams throughout the United States.

B. Purpose

The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

Carbaugh Run Dam consists of an earthfill embankment with a spillway in its left abutment and a concrete intake tower. Three gate controls are located on the tower. One controls the flow through a 60-inch diameter outlet pipe, and the other two are used for control of water supply intake. The embankment reaches a maximum height of 35 feet above the downstream toe and has a total length of about 800 feet between the spillway and the right abutment. The upstream and downstream slopes have dumped rock slope protection.

The spillway is a 40 foot long round crested weir and is located between two concrete abutment walls. The spillway channel consists of a concrete slab with concrete walls. Energy dissipating blocks are located at the end of the channel. The 60-inch diameter outlet pipe terminates in the stilling basin.

B. Location: Franklin Township, Adams County
U.S.G.S. Quadrangle - Iron Springs, PA
Latitude 39°-52.3', Longitude 77°-27.1'
Appendix E, Plates I & II

C. Size Classification: Small: Height - 35 feet
Storage - 365 acre-feet

411003

D. Hazard Classification: High (Refer to Section 3.1.E.)

E. Ownership: Pennsylvania Department of Public Welfare
South Mountain Restoration Center
Mr. John W. Hinkle, I.M.S.
South Mountain, PA 17261

F. Purpose: Water Supply

G. Design and Construction History

The dam and its appurtenant structures were designed by Glace and Glace, Inc., Harrisburg, Pennsylvania. A permit for construction was issued on October 29, 1957. Maitland Brothers, the contractor, started work on January 22, 1959, and a pre-final inspection was made on May 12, 1960.

H. Normal Operating Procedures

The reservoir is used by the owner as a water supply storage reservoir. Water is taken from the reservoir by opening one of the two gates on the intake tower, both of which are connected to the water main. The outlet gate is generally opened sufficiently to permit the required minimum flow from the reservoir to the downstream channel. All inflow above normal pool level is discharged through the spillway.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files:	3.2
Computed for this report:	3.28
Use:	3.28

B. Discharge at Dam Site (cubic feet per second)
See Appendix D for hydraulic calculations.

Maximum known flood (estimated from records of U.S.G.S. gaging station on nearby Conococheaque Creek)	278
Outlet works at pool Elev. 1320	62
Outlet works at low pool Elev. 1306	26
Spillway capacity at pool Elev. 1329.6 (low point of dam)	4283

C. Elevation (feet above mean sea level)

Top of dam (low point)	1329.6
Top of dam (design crest)	1331
Spillway crest	1320
Upstream portal invert	1302
Downstream portal invert	1298.2
Streambed at downstream toe of dam (estimate)	1295

D. Reservoir (miles)

Length of normal pool (Elev. 1320)	.2
Length of maximum pool (Elev. 1329.6)	.3

E. Storage (acre-feet)

Spillway crest (Elev. 1320)	153
Top of dam (Elev. 1329.6)	365

F. Reservoir Surface (acres)

Spillway crest (Elev. 1320)	19.3
Top of dam (Elev. 1329.6)	25.4

G. Dam

Refer to Plates VI and VII in Appendix E for plan and section.

Type: Earthfill embankment.

Length: 800 feet.

Height: 35 feet.

Top Width: Design - 12 feet; Survey - 11 feet.

Side Slopes:

	Design	Surveyed
Upstream	2.5H to 1V	2.2H to 1V
Downstream	2.0H to 1V	1.8H to 1V
Rock Toe	2.5H to 1V	1.7H to 1V

Zoning: Impervious core with semi-pervious fill and dumped rock on the outside.

Cutoff: Trench excavated on centerline dam. Bottom trench width is 10 feet.

Grouting: A report indicates that grouting was to depend on field conditions after excavation of trench. As-built drawings are not available. There are no records indicating that grouting was used.

H. Outlet Facilities

Type: 60" diameter concrete pipe.

Closure: 24" slide gate on upstream end.

Location: Near left abutment. Pipe discharges through downstream end of spillway channel wall.

I. Spillway

Type: Concrete round crested weir.

Length of Weir: 40 feet.

Crest Elevation: 1320 feet.

Location: Left abutment.

J. Regulating Outlets

See Section 1.3.H. above.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The available engineering data for Carbaugh Run Dam is limited to a set of construction drawings. Several of the pertinent drawings are reproduced in Appendix E of this report. The files also contained a report prepared by the Pennsylvania Department of Environmental Resources (PennDER) upon the application for a permit. This report indicates that stability calculations were made by the designer. An extensive test boring program was executed prior to the design of the dam (Plate III, Appendix E). The previously mentioned report states that the spillway capacity was calculated to be 4750 cfs. The required capacity was 2775 cfs, leaving a freeboard of 4.3 feet.

2.2 CONSTRUCTION

The available construction data are very limited. They consist of a pre-final inspection report and a tabulation of extra quantities. This tabulation indicates that the core trench excavation exceeded the estimated amount.

A letter indicates that excavation of the spillway channel exposed soft and laminated rock, rather than hard non-yielding rock. The letter questioned if the foundation of the walls had to be revised. There are no records that changes were made. The letter indicates that the rock in the core trench weathered at a rapid rate. The rock for the toe drain was obtained from the spillway excavation and appeared to be too shattered and small sized to be effective. The rock appeared to decompose to clay at a fast rate.

2.3 OPERATION

Formal records of operation are not maintained by the owner. Maximum discharges over the spillway crest are unknown. An inspection report by PennDER indicates that leakage was apparent through the joints at the end of the right forebay wall as early as spring, 1960.

2.4 EVALUATION

A. Availability

The available engineering data is contained in the files of PennDER, Harrisburg, Pennsylvania.

B. Adequacy

The available engineering and construction data, combined with the field inspection are considered to be adequate for making a reasonable assessment of the dam.

C. Operating Records

Operating records, including maximum pool levels, have not been maintained.

D. Post Construction Changes

The visual inspection did not indicate that post construction changes were made at these facilities.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of Carbaugh Run Dam is good. The embankment slopes have dumped rock slope protection. A small amount of brush is growing on the slopes. Most of the immediate area at the downstream toe is wet and soggy. Standing water was noticed at many places. The footbridge has moved slightly on its abutment. This indicates either movement of the abutment, which is founded in the fill, or movement of the intake structure. There were no signs of structural distress. The main concern is leakage that was observed at the bottom joint of the right spillway wall.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report. Photographs of the facilities taken during the inspection are reproduced in Appendix C. Representatives of the owner accompanied the inspectors.

B. Embankment

The horizontal alignment of the embankment is good. The vertical profile of the dam (Plate A-II, Appendix A), indicates that the crest of the dam is below the design crest elevation adjacent to both spillway walls.

The upstream slope is protected with dumped rock. Some weeds are growing near the normal pool elevation. The dumped rock is weathering. The top of the dam embankment is mostly bare due to vehicular traffic to the intake control tower (Photograph No. 1).

The downstream slope is also covered with dumped rock. The slope is irregular due to the method of placing the rock and the large variation in size of rock. Some weed growth has started and should be controlled before it becomes a problem.

A twenty foot wide area at the downstream toe has been cleared of trees and brush (Photographs No. 4 and No. 5). This area is flat, wet and swampy over most of its length. Pools of standing water are located close to the stilling basin (Photograph No. 6). This condition is probably caused by seepage and is accentuated due to the poor drainage conditions adjacent to the downstream toe. There was no noticeable flow of water.

C. Appurtenant Structures

The intake control tower (Photograph No. 3) is located close to the spillway forebay area at the upstream toe. There are three gate operator stands on the platform. One gate controls the flow through the 60-inch diameter outlet pipe. This 24-inch gate is generally slightly open to meet the minimum downstream flow criteria. The other two gates control the water supply intake. The tower appears to be in good condition with a slight deterioration of the concrete at the normal pool level. Access to the tower is by a footbridge from the crest of the dam. A 2.5-inch displacement was noticed at the bearing of the bridge at the abutment. This condition is not considered serious. The abutment is constructed on the fill and it is possible that the abutment has moved. The 60-inch diameter outlet pipe terminates in the stilling basin.

The spillway is located in the left abutment. The forebay is formed by two concrete wingwalls and a steep rock cut at the left side (Photograph No. 7). The spillway crest is angled upstream to the centerline of the dam. The spillway discharge channel is formed by concrete walls and a concrete slab (Photograph No. 9). Energy dissipating blocks are located at the end of the spillway chute and the concrete walls and slab are extended beyond these blocks. Weep holes are located in the slab and the left wall. All concrete of the spillway and discharge channel is in good condition. There were no signs of cracks or wall movements. Considerable seepage was noticed through the joint between the right wall and the slab beyond the energy dissipation blocks (Photograph No. 10). Rust coloring of the wall and some deterioration of the concrete at the joint indicates possible future problems with the stability of this wall section.

D. Reservoir Area

The reservoir area is surrounded by wooded moderate slopes. The banks appear to be stable. Sedimentation problems have not been reported.

E. Downstream Channel

The immediate downstream channel is a natural mountain stream channel with moderate to steep slopes. A campground with some permanent buildings is located about two miles downstream from the dam. A mile further downstream, Carbaugh Run flows through a golf course and then crosses U.S. Route 30. Based on the field observation, the potential hazard to loss of life downstream of the dam is more than a few if the dam fails. The hazard category is therefore considered to be "High."

3.2 EVALUATION

The overall visual evaluation of Carbaugh Run Dam indicates that the facilities are in good condition. Although the area downstream of the toe indicates that seepage exists, the amount is not considered serious at this time. A concern exists for the future stability of the stilling basin wall where rusting of the reinforcing steel could cause failure of the section.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The dam and reservoir were constructed to provide a water supply storage for the South Mountain Restoration Center. The construction permit from PennDER requires a minimum flow of 315,000 gallons per day to the downstream channel. The outlet gate is operated regularly to control this flow. All inflow above the normal pool level is discharged over the spillway.

4.2 MAINTENANCE OF DAM

The embankment slopes have a dumped rock surface and require little maintenance. Some weed growth has started and should be removed to prevent future problems.

4.3 MAINTENANCE OF OPERATING FACILITIES

The operating facilities are the three gates on the intake control tower. The operating stands are maintained and operated at regular intervals.

4.4 WARNING SYSTEM

There is no formally organized surveillance and downstream warning system in existence at the present time.

4.5 EVALUATION

The operational procedures for Carbaugh Run Dam are adequate. It is recommended that a program be developed for regular maintenance of the dam, which should include the removal of weeds and brush. The greasing and operation of the drawdown gate should be continued on a regular basis. A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

The hydrologic and hydraulic analysis available from PennDER for Carbaugh Run Dam was not very extensive. No area-capacity curve, frequency curve, unit hydrograph, design storm, design flood hydrograph, or flood routings were available. A report by PennDER states that the required spillway capacity was 2772 cfs.

B. Experience Data

There are no records of flood levels at Carbaugh Run Dam. Based on records of the U.S.G.S. stream gage on Conococheaque Creek at nearby Fayetteville, Pennsylvania, the maximum inflow to Carbaugh Run Dam occurred in June, 1972, and has an estimated inflow of 278 cfs. This flood was passed without reported difficulties.

C. Visual Observations

On the date of the inspection, no conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily until the dam is overtopped.

D. Overtopping Potential

Carbaugh Run Dam has a total storage capacity of 365 acre-feet and an overall height of 35 feet above streambed. These dimensions indicate a size classification of "Small." The hazard classification is "High" (see Section 3.1.E.).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. Because of the small size of this dam and the small population downstream, the recommended SDF is one-half the PMF. For this dam, the SDF peak inflow is 4920 cfs (see Appendix D for HEC-1 inflow computations).

Comparison of the calculated SDF peak inflow of 4920 cfs with the estimated spillway discharge capacity of 4283 cfs indicates that a potential for overtopping of the Carbaugh Run Dam exists.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that this dam does not have the necessary storage to pass the SDF without overtopping. The SDF will cause an overtopping of 0.7 feet. This amount is not considered sufficient to cause failure because of the heavy riprap stone on the downstream slope (refer to Plate VII, Appendix E). The spillway-reservoir system can pass a flood event equal to 45% of a PMF

without overtopping based on the existing low point of the dam profile. If the top of the dam would be made uniform at the design crest elevation, the discharge and storage capacity would be able to handle 56% of a PMF without overtopping.

E. Spillway Adequacy

Calculations show that the spillway discharge capacity and reservoir storage capacity, based on the present low point in the dam profile, combine to handle 45% of the PMF (refer to Appendix D).

Since the total spillway discharge and reservoir storage capacity cannot pass the SDF without overtopping, and since the overtopping of the dam by the SDF is not expected to cause failure of the dam, the spillway is considered to be inadequate, but not seriously inadequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection of Carbaugh Run Dam did not detect any signs of embankment instability. The field survey indicates that the embankment slopes are steeper than the design slopes. They appear, however, to be adequate for the height of dam under consideration. The field survey indicates that the crest of the dam is above the design elevation except areas adjacent to the spillway abutment walls. The seepage noted is apparently due to drainage from the rock fill within the downstream slope and is not considered to be a serious problem at this time (refer to Plate VII, Appendix E).

2. Appurtenant Structures

Visual inspection of the intake control tower did not detect signs of structural instability. Although the footbridge has moved in relation to the abutment, this movement is probably caused by movement of the abutment in the fill. It apparently has stabilized and is not considered to be a serious problem.

The leakage through the joint at the base of the stilling basin wall indicates that the construction joint was apparently not cleaned out prior to the pouring of the wall section. Rusting of the reinforcing steel and freeze-thaw cycles of the concrete in this area could eventually cause failure of the wall. All other walls and slabs of the spillway and spillway channel are in good condition.

B. Design and Construction Data

1. Embankment

The typical embankment sections (Plate VII, Appendix E) indicates a zoned earthfill embankment with a cutoff trench extending to sound rock. The rock is overlaid with sand and gravel. A large rock toe drain is indicated at the downstream toe. The PennDER report upon the application for construction of the dam indicates that the designer made stability studies. The reported factors of safety were 1.1 and 1.5 for the upstream and downstream slopes respectively. The conditions for which these values were calculated were not identified. The inspection indicates steeper slopes than shown on the design drawings. Annual inspections should pay particular attention to the slope condition for any signs of distress.

The rock toe has not been provided with positive drainage outlets and the seepage at the stilling basin wall could be the natural outlet for this drain. The rock used for the toe drain was apparently of poor quality. Records of construction are not available.

2. Appurtenant Structures

The intake control tower is constructed of reinforced concrete. The top section is a T-section. The lower section is a solid rectangular section with concrete wingwalls which retains the fill (Plate VIII, Appendix E). The outlet pipe has been provided with anti-seepage collars. The water supply pipe was encased in concrete and also provided with anti-seepage collars. The spillway discharge channel was designed as a U-frame with the slab acting as the footer for the walls. Cutoff walls were placed under the slab (Plate X, Appendix E).

C. Operating Records

Operating records for this dam have not been maintained by the owner.

D. Post Construction Changes

There are no indications that post construction modifications have been made to the dam or its appurtenant structures.

E. Seismic Stability

This dam is located in Seismic Zone 1, and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection and the review of the construction drawings indicates that Carbaugh Run Dam is in good condition. The leakage through the stilling basin wall joint could cause failure of this wall if not corrected. Although the area downstream from the toe was wet and soggy, the seepage is not considered to be a serious problem at this time.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge of the spillway is sufficient to pass 45 percent of the PMF with the existing condition. The spillway is considered to be inadequate but not seriously inadequate.

B. Adequacy of Information

The design information contained in the files, combined with the visual inspection, are considered to be sufficiently adequate for making a reasonable assessment of this dam.

C. Urgency

The recommendations presented below should be implemented immediately.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

In order to assure the continued saitsfactory operation of this dam, the following recommendations are presented for implementations by the owner:

1. That the crest of the embankment be raised to its design crest elevation of 1331.0 over its full length to make the spillway capacity adequate to pass the SDF.

2. That a positive outlet be provided for the toe drain near the end of the stilling basin.

3. That the seepage condition at the downstream toe be monitored on a regular basis. If an increase in quantity or turbidity is detected, immediate steps shall be taken to correct this condition.

4. That the joint of the right stilling basin wall be repaired and sealed from both sides.

5. That all brush and high weeds be removed from the embankment on an annual basis.

6. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.

7. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

APPENDIX A

CHECK LIST OF VISUAL INSPECTION REPORT

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 1-77 NDI NO. PA-00 881

NAME OF DAM (South Mountain Restoration Dam) Carbaugh Run Dam HAZARD CATEGORY High

TYPE OF DAM Earthfill embankment

LOCATION Franklin TOWNSHIP Adams COUNTY, PENNSYLVANIA

INSPECTION DATE 10/10/80 WEATHER Rain, Cloudy, Cool TEMPERATURE 50-60°

INSPECTORS: R. Houseal (Recorder) OWNER'S REPRESENTATIVE(s):

H. Jongsma M. Scubelek

R. Shireman E. Carbaugh

A. Bartlett J. Hinkle

NORMAL POOL ELEVATION: 1320.0 AT TIME OF INSPECTION:

BREAST ELEVATION: 1331.0 POOL ELEVATION: 1317.9

SPILLWAY ELEVATION: 1320.0 TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

The reservoir is used for water supply. Seepage along the downstream toe is evident as well as at the right spillway wall joint with the slab at the end of structure.

NDI NO. PA-00 881

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None observed.
B. UNUSUAL MOVEMENT BEYOND TOE	None observed.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	Dumped rock slopes - irregular due to method of placement.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal - good. Vertical - Refer to profile Plate A-II.
E. RIPRAP FAILURES	There are no apparent failures of the dumped rock slopes, but they are slightly irregular due to the method of placement.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Good.
G. SEEPAGE	Seepage is evident along the entire length of the toe of the downstream slope. There is no extensive flow, but the area is wet and swampy, and has free standing water. Poor drainage of downstream area.
H. DRAINS	Refer to plans.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Top of dam is mostly bare due to vehicular wheel tracks. Some weeds are growing near the edge of the crest. Upstream and downstream slopes are covered with dumped rock.

NDI NO. PA-00 881

VISUAL INSPECTION
OUTLET WORKS

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	Concrete tower with three gate controls. Concrete in good condition above normal pool. Slightly deteriorated below normal pool.
B. OUTLET STRUCTURE	Outlet is through spillway outlet channel wall on right side; 60"diameter conrete pipe.
C. OUTLET CHANNEL	Outlet through 60-inch diameter concrete pipe enters spillway discharge channel through vertical wall.
D. GATES	Three gates: one slightly open to maintain low flow in creek. One gate for drawdown, two gates for water supply.
E. EMERGENCY GATE	24-inch slide gate on 60-inch pipe.
F. OPERATION & CONTROL	Gates are operated several times per month to insure operation.
G. BRIDGE (ACCESS)	Concrete deck with end pier on embankment. 2-1/2" displacement of superstructure noted at pier.

NDI NO. PA-00 881

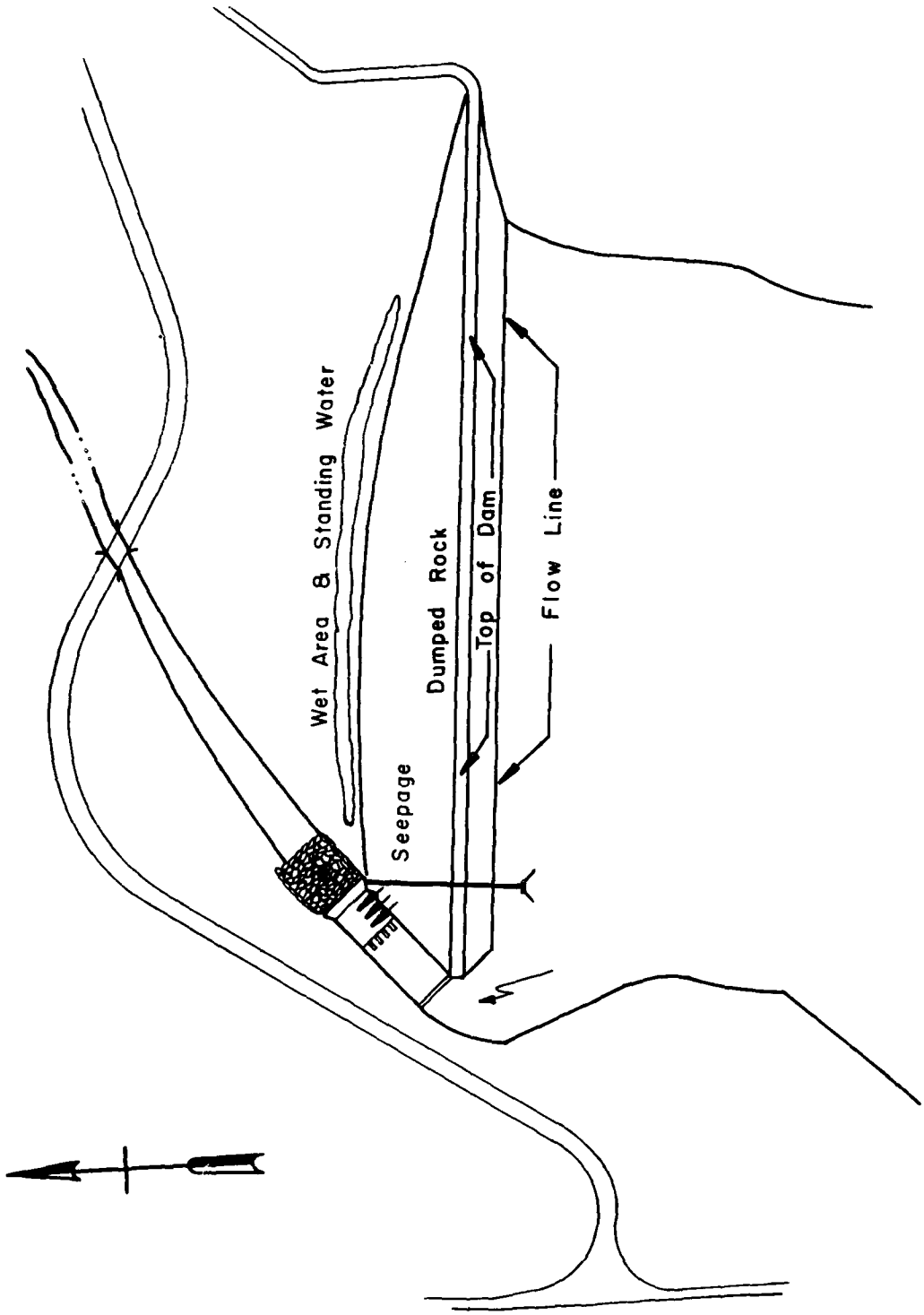
VISUAL INSPECTION
SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Approach is directly from the reservoir at left end of embankment.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Concrete round crested weir - good condition.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Concrete lined discharge channel slabs, walls and energy blocks all in good condition. Weep holes in left wall - none in right wall. Seepage noted at slab level on right wall at three locations - all at vertical joints.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	Uncontrolled round crested weir spillway.
F. CONTROL & HISTORY	No records.

NDI NO. PA-00 881

VISUAL INSPECTION

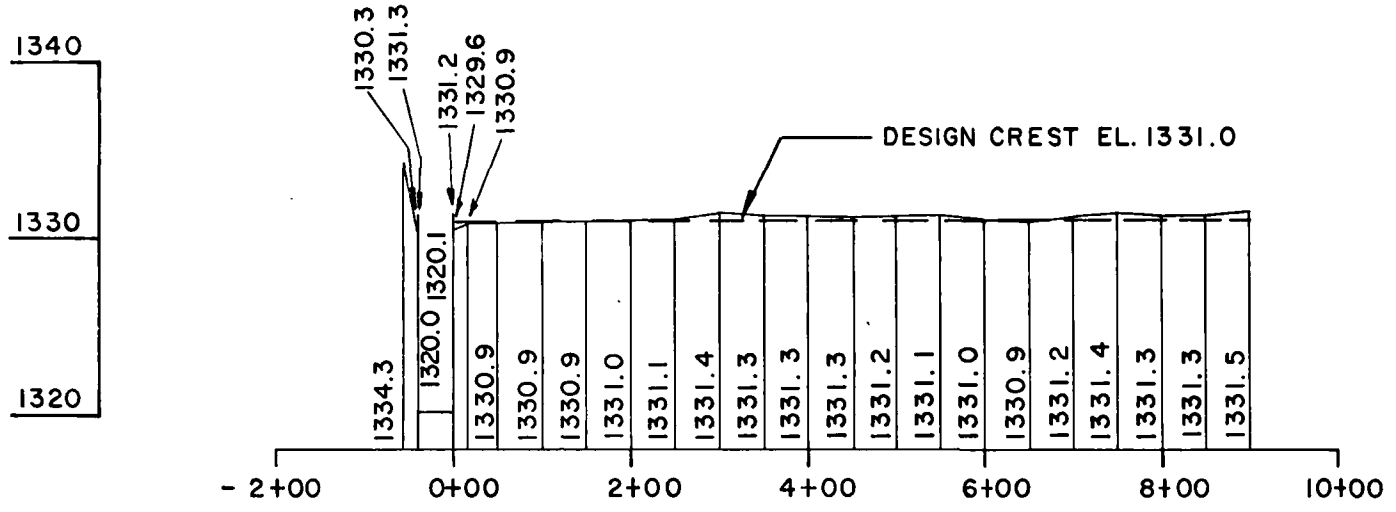
	OBSERVATIONS AND REMARKS
INSTRUMENTATION Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	No formal gage - hand painted marks on intake tower.
Other	None.
RESERVOIR Slopes	Wooded.
Sedimentation	None reported.
Watershed Description	Woodlands.
DOWNSTREAM CHANNEL Condition	Natural mountain stream channel.
Slopes	Moderate to steep, rock lined, stable.
Approximate Population	About 2 miles downstream a campground with some permanent dwellings.
No. Homes	Twenty.



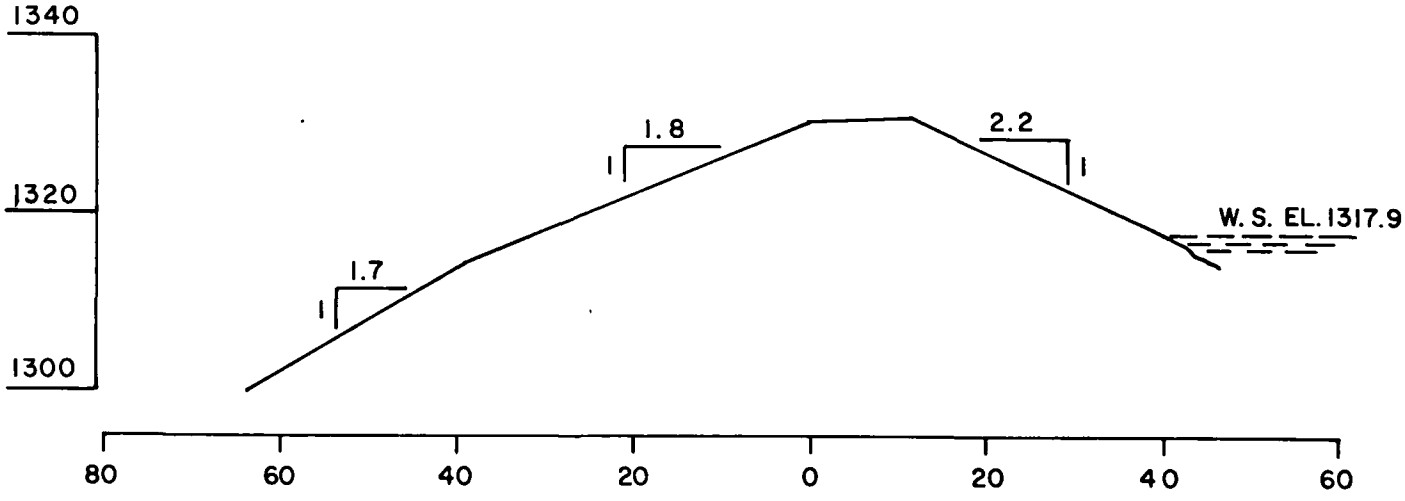
CARBAUGH RUN DAM
PA - 00881
INSPECTION SURVEY

SURVEYED 10 - 10 - 80

PLATE A- I



EMBANKMENT PROFILE



EMBANKMENT SECTION
STA. 2+50

SURVEYED 10-10-80

CARBAUGH RUN DAM
PA-00881
INSPECTION SURVEY
PLATE A-II

APPENDIX B

CHECK LIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER #1-077 NDI NO. PA-00881

NAME OF DAM CARBAUGH RUN DAM

ITEM	REMARKS
AS-BUILT DRAWINGS	Not available.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle - Iron Springs, PA See Plate II, Appendix E
CONSTRUCTION HISTORY	Construction permit issued on October 29, 1957. Maitland Construction, contractor started work on January 22, 1959. Prefinal inspection on May 12, 1960.
GENERAL PLAN OF DAM	Plate III, Appendix E.
TYPICAL SECTIONS OF DAM	Plate VII, Appendix E.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	 Plate VIII, Appendix E. Plate IX, Appendix E. Not available.

NDI NO. PA-00 881

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	No records.
DESIGN REPORTS	Not available.
GEOLOGY REPORTS	One letter describing results of site visit prior to construction by Dr. Carlyle Gray, State Geologist.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	Included on design drawings (Plates III, IV, & V, Appendix E). No records. No records.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Unknown. Apparently from cut for forebay and spillway. See Plate III, Appendix E.

NDI NO. PA-00 381

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	No accidents or failures.
MAINTENANCE & OPERATION RECORDS	No records.
SPILLWAY PLAN, SECTIONS AND DETAILS	Plate X, Appendix E.

NDI NO. PA-00 881

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	Plates VIII & IX, Appendix E.
CONSTRUCTION RECORDS	No records.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	Inspection reports by PennDER. No deficiencies.
MISCELLANEOUS	

NDI NO. PA-00881

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Woodland

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 1320 Acre-Feet 153

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 1329.6 Acre-Feet

MAXIMUM DESIGN POOL: Elev. 1326.7

TOP DAM: Elev. 1329.6

SPILLWAY:

a. Elevation 1320

b. Type Round crested weir.

c. Width 40'

d. Length --

e. Location Spillover Left abutment.

f. Number and Type of Gates None.

OUTLET WORKS:

a. Type 24" gate on 60" pipe.

b. Location Near spillway.

c. Entrance inverts 1302

d. Exit inverts 1298.2

e. Emergency drawdown facilities 24" gate.

HYDROMETEOROLOGICAL GAGES:

a. Type None.

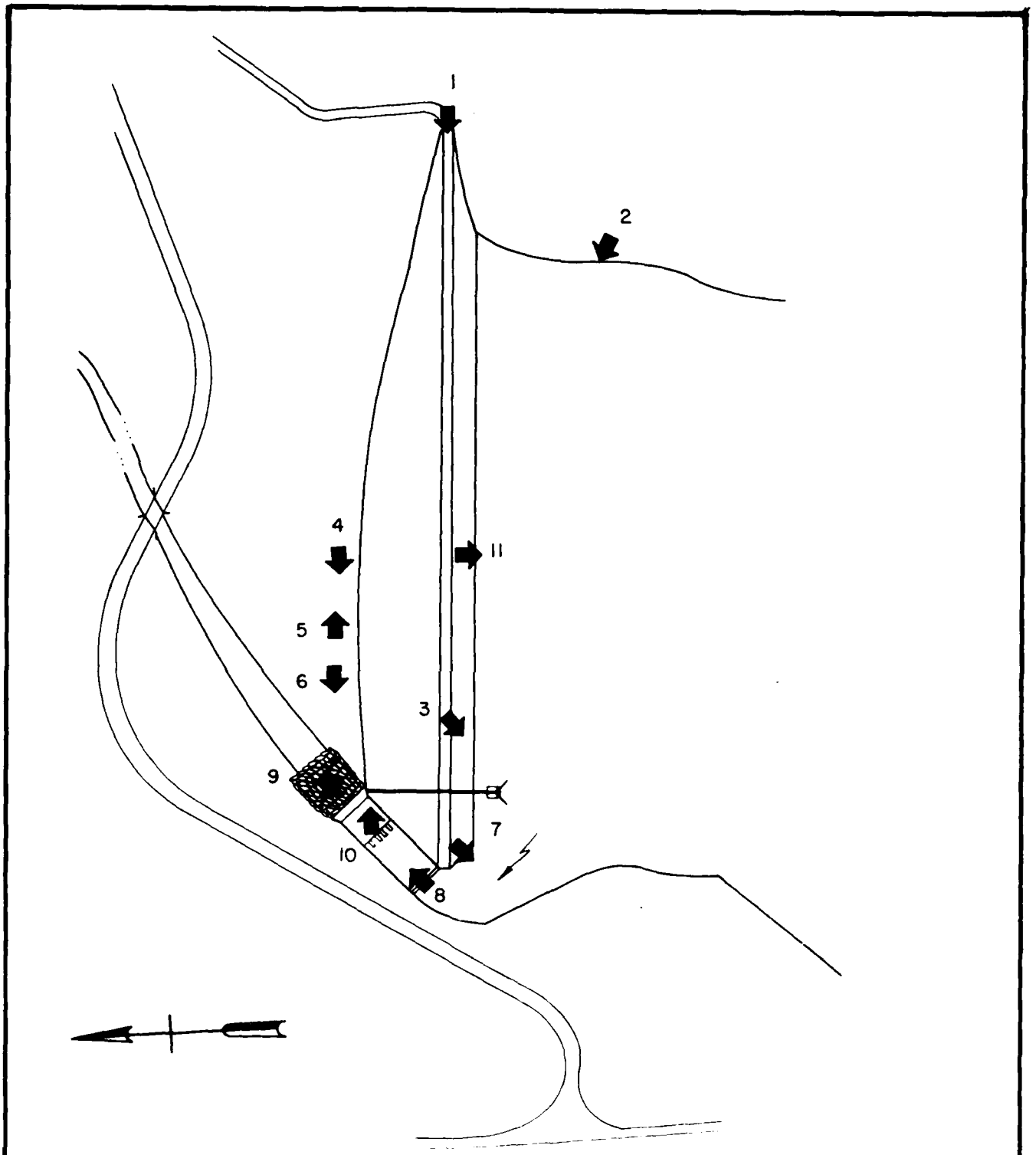
b. Location

c. Records

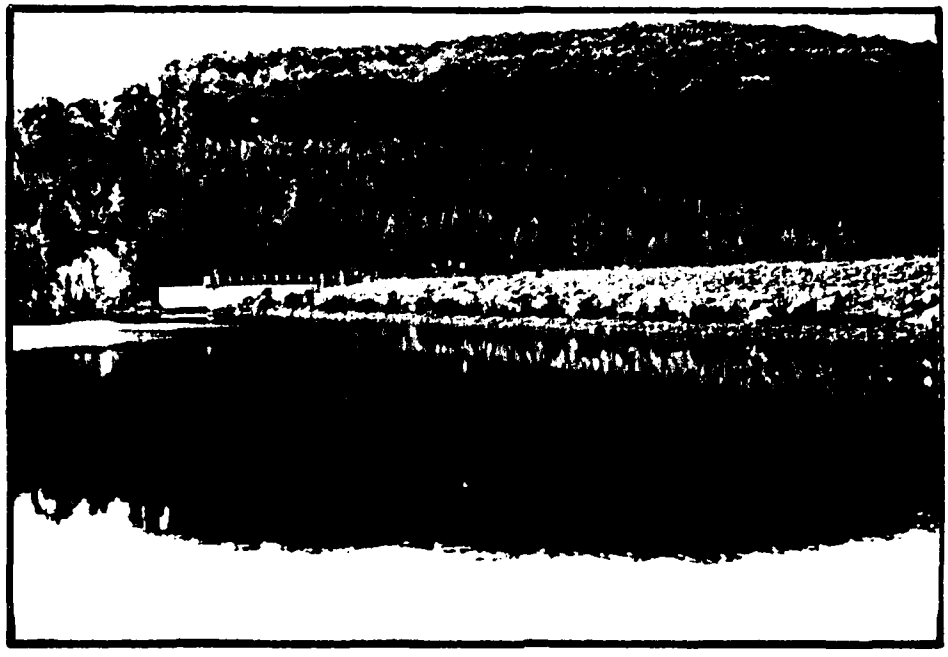
MAXIMUM NON-DAMAGING DISCHARGE: 4283 cfs.

APPENDIX C

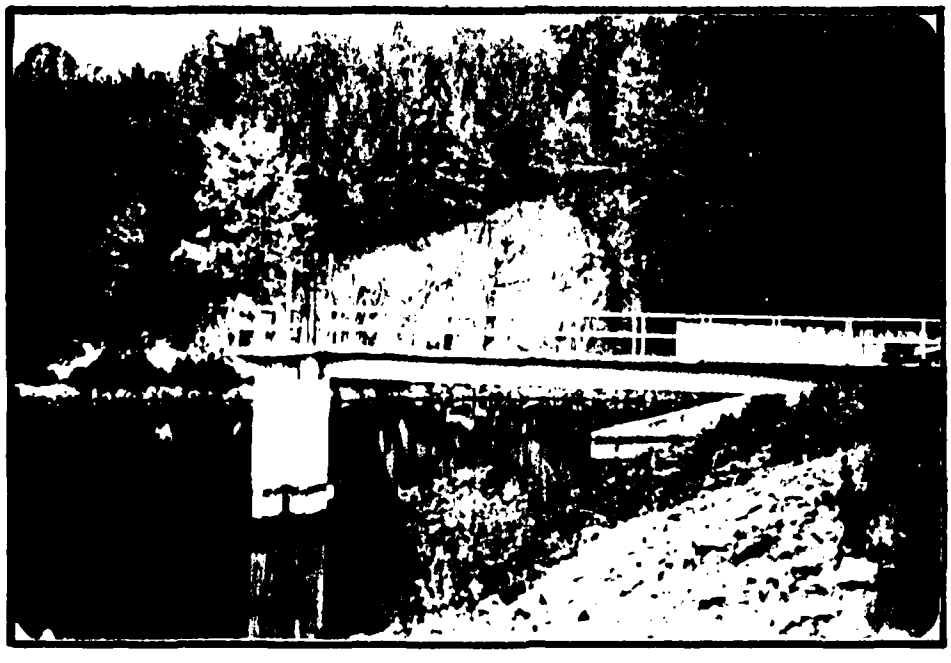
PHOTOGRAPHS



CARBAUGH RUN DAM
PA - 00881
KEY MAP OF PHOTOGRAPHS
PLATE C-I



UPSTREAM FACE OF DAM - NO. 2



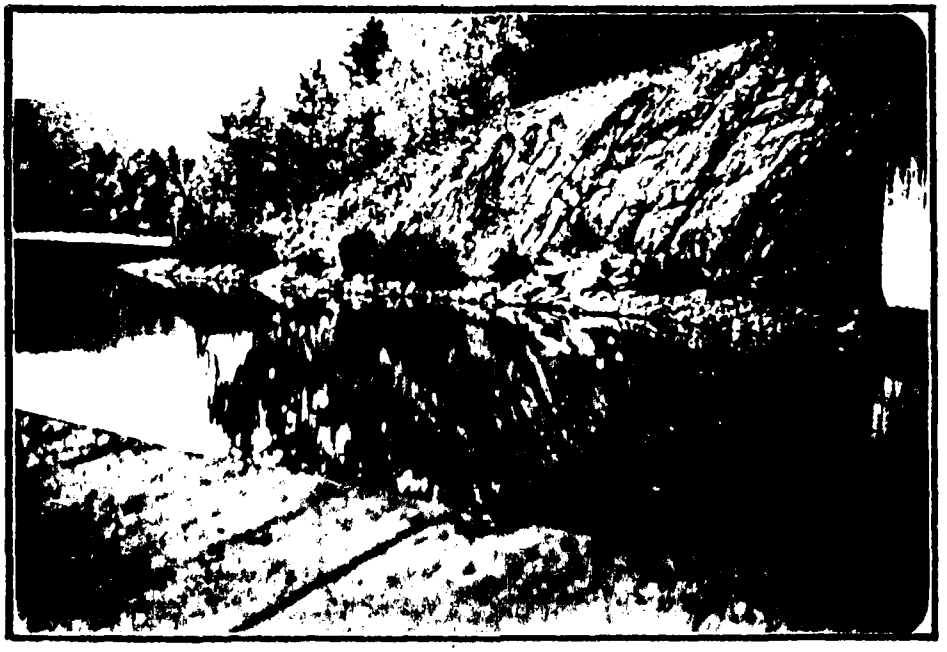
INTAKE TOWER & FOOTBRIDGE - NO. 3

PA-00881
Plate C-11

DOWNSTREAM SLOPE LOOKING TO SPILLWAY - NO. 4

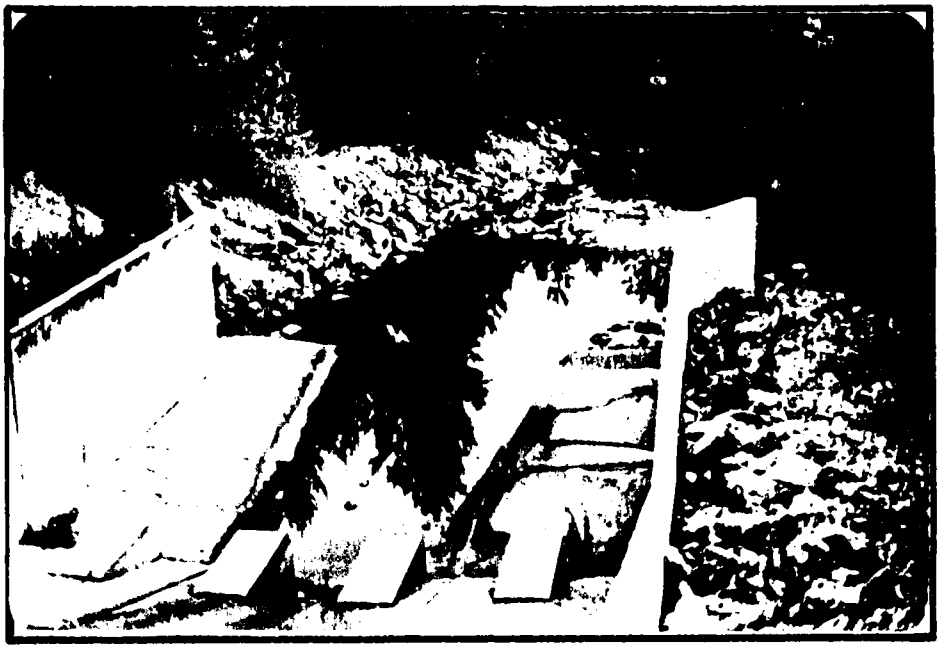
DOWNSTREAM SLOPE - WET CONDITION ALONG TOE - NO. 5

DOWNSTREAM NEAR STILLING BASIN - NO. 6
NOTE: STANDING WATER

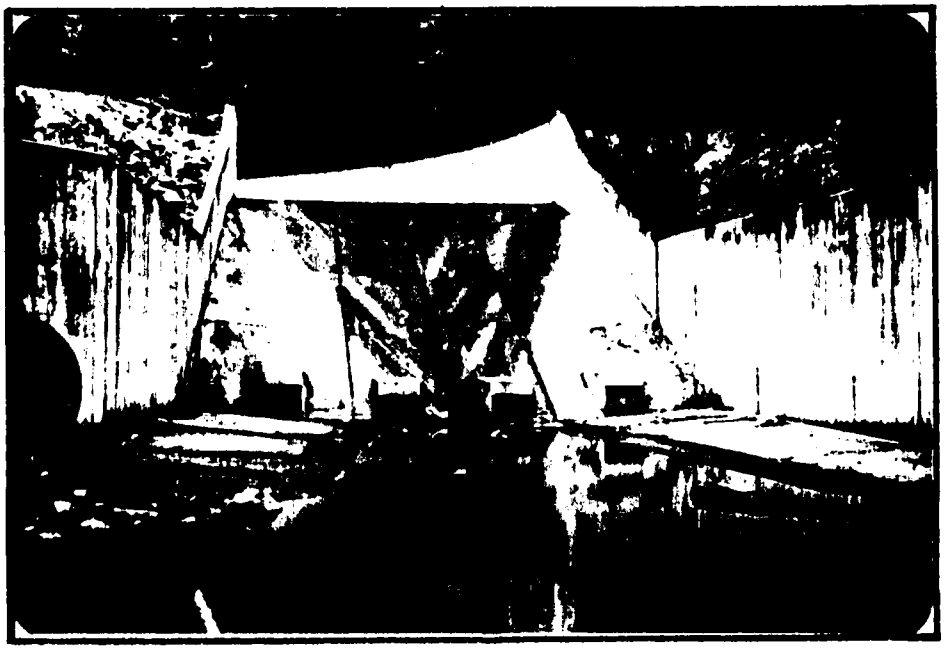


SPILLWAY FOREBAY - NO. 7

PA-00881
Plate C-IV



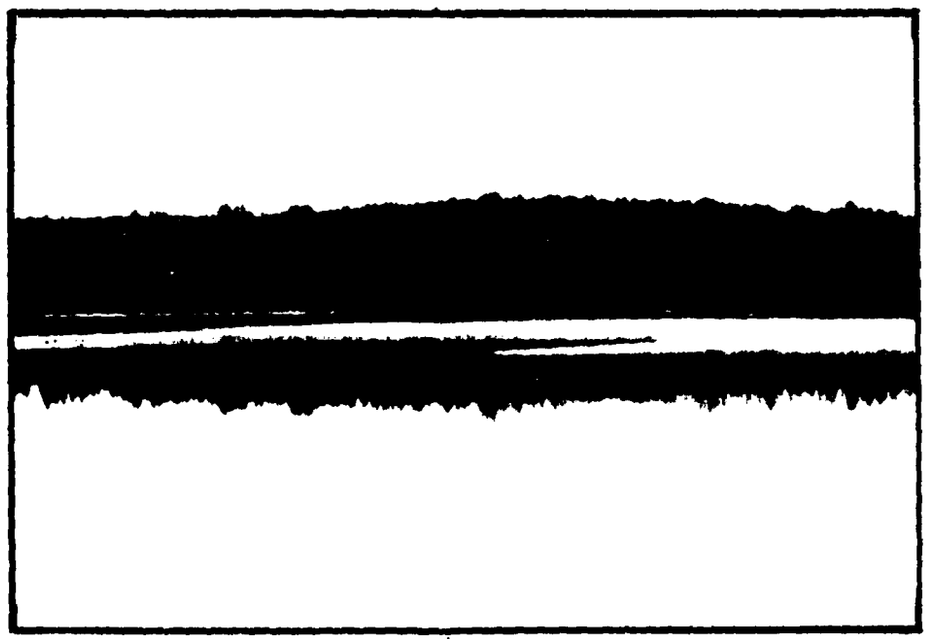
STILLING BASIN - NO. 8



SPILLWAY CHUTE & STILLING BASIN - NO. 9

PA-00881
Plate C-V

RIGHT SPILLWAY WALL SEEPAGE & OUTLET PIPE - NO. 10



RESERVOIR - NO. 11

PA-00881
Plate C-VI

APPENDIX D

HYDROLOGY AND HYDRAULIC CALCULATIONS

SUMMARY DESCRIPTION
OF
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

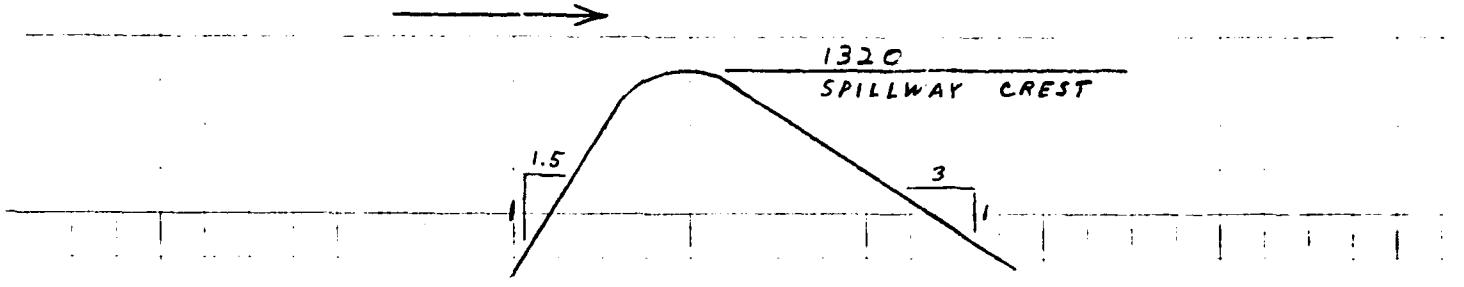
The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California.

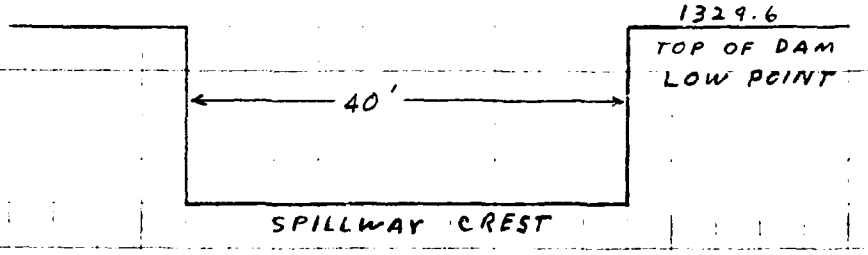
BY RLS DATE 10/23/80 **BERGER ASSOCIATES** SHEET NO. 1 OF 7
CHKD. BY DJR DATE 11/4/80 PROJECT 0590
SUBJECT CARBAUGH RUN DAM

SPILLWAY RATING



ROUND CRESTED WEIR

$C = 3.6$ (ESTIMATED FROM KING'S HDBK.)



$Q = C L H^{3/2}$

$C = 3.6$

$L = 40'$

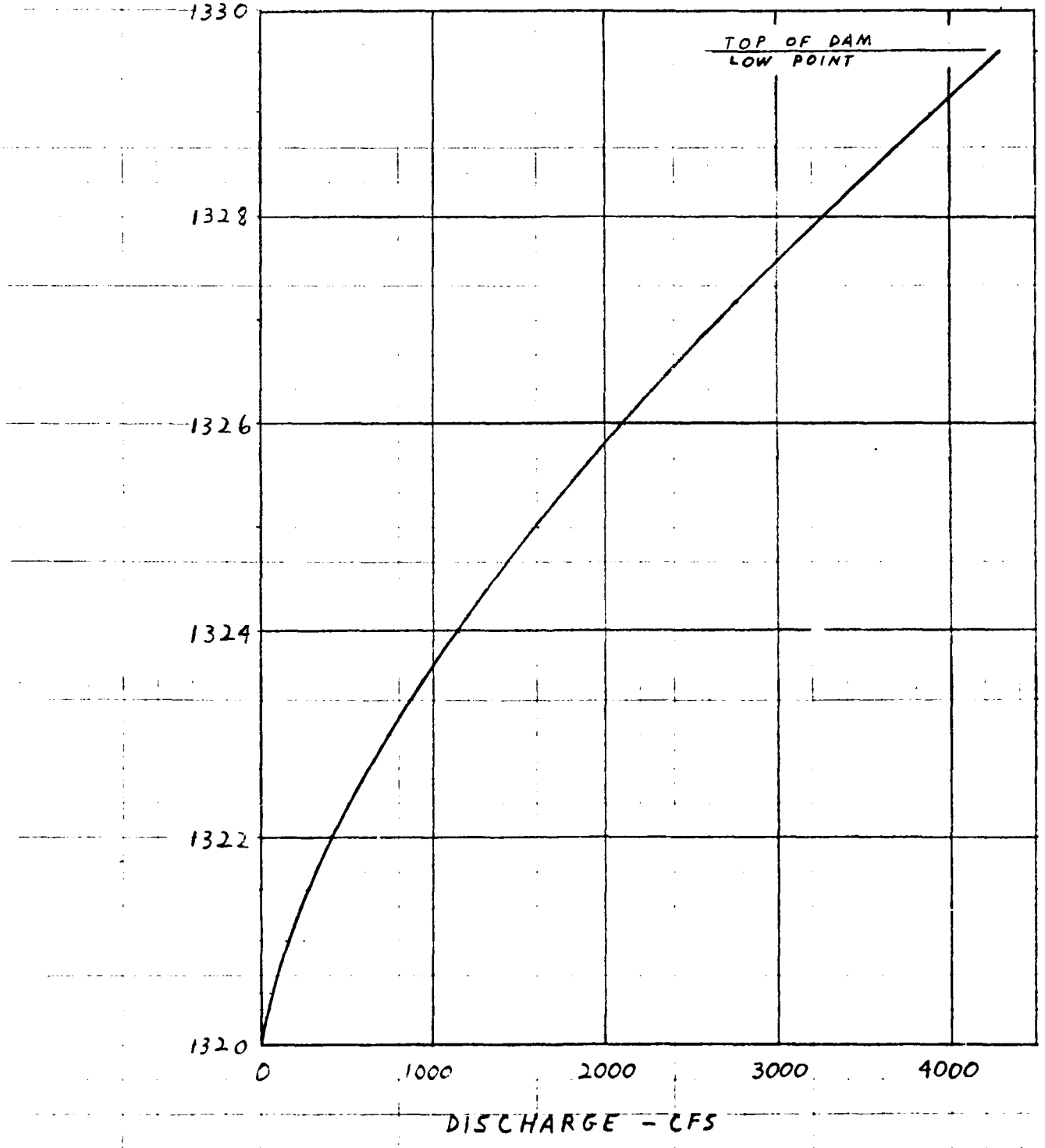
$H = 1329.6 - 1320 = 9.6'$

$Q = 3.6 \times 40 \times (9.6)^{1.5}$

$= 4283$ CFS

BY RLS DATE 10/23/80 BERGER ASSOCIATES SHEET NO. 2 OF 7
CHKD. BY DJR DATE 11/4/80 PROJECT D0590
SUBJECT CARBAUGH RUN DAM

SPILLWAY RATING CURVE



BY RLS DATE 10/23/80 BERGER ASSOCIATES SHEET NO. 3 OF 7
CHKD. BY DJR DATE 11/4/80 PROJECT D0590
SUBJECT CARBAUGH RUN DAM

DISCHARGE THROUGH OUTLET WORKS

24" SLIDE GATE ON 60" PIPE

ELEV. OF CENTER OF ORIFICE = 1303

C = 0.6 (KING'S HDBK)

$Q = CA\sqrt{2gH}$

AT ELEV 1320

$H = 1320 - 1303 = 17'$

$Q = 0.6 \times \pi \times (2)^2/4 \times (2 \times 32.2 \times 17)^{0.5}$

$= 62.4$ SAY 62 CFS

AT LOW POOL ELEV 1306

$H = 1306 - 1303 = 3'$

$Q = 0.6 \times \pi \times (2)^2/4 \times (2 \times 32.2 \times 3)^{0.5}$

$= 26.2$ SAY 26 CFS

BY RLS DATE 10/30/80 **BERGER ASSOCIATES** SHEET NO. 4 OF 7
CHKD. BY JNR DATE 11/5/80 PROJECT D0590
SUBJECT CARBAUGH RUN DAM

EMBANKMENT RATING

$Q = C L H^{3/2}$ $C = 2.7$ (King's Hdbk.)

AT ELEV. 1330

$2.7 \times 4 \times (.2)^{1.5} = 1$ cfs

AT ELEV. 1331

$2.7 \times 14 \times (.75)^{1.5} = 25$
$2.7 \times 135 \times (.1)^{1.5} = 12$
$2.7 \times 50 \times (.05)^{1.5} = 2$
$2.7 \times 67 \times (.05)^{1.5} = 2$
$2.7 \times 2 \times (.35)^{1.5} = 1$ $\Sigma = 42$ cfs

AT ELEV. 1331.5

$2.7 \times 14 \times (1.25)^{1.5} = 53$
$2.7 \times 135 \times (.6)^{1.5} = 169$
$2.7 \times 100 \times (.5)^{1.5} = 95$
$2.7 \times 50 \times (.25)^{1.5} = 17$
$2.7 \times 50 \times (.15)^{1.5} = 8$
$2.7 \times 100 \times (.2)^{1.5} = 24$
$2.7 \times 200 \times (.4)^{1.5} = 137$
$2.7 \times 50 \times (.45)^{1.5} = 41$
$2.7 \times 50 \times (.2)^{1.5} = 12$
$2.7 \times 50 \times (.15)^{1.5} = 8$
$2.7 \times 50 \times (.2)^{1.5} = 12$
$2.7 \times 50 \times (.1)^{1.5} = 4$
$2.7 \times 4 \times (.6)^{1.5} = 5$ $\Sigma = 584$ cfs

AT ELEV. 1332

$2.7 \times 14 \times (1.75)^{1.5} = 88$
$2.7 \times 135 \times (1.1)^{1.5} = 421$
$2.7 \times 100 \times (1)^{1.5} = 270$
$2.7 \times 50 \times (.75)^{1.5} = 89$
$2.7 \times (50+50) \times (.65)^{1.5} = 141$
$2.7 \times (100+50+50) \times (.7)^{1.5} = 316$
$2.7 \times 200 \times (.9)^{1.5} = 461$
$2.7 \times 50 \times (.95)^{1.5} = 125$
$2.7 \times 50 \times (.6)^{1.5} = 63$
$2.7 \times 6 \times (.95)^{1.5} = 13$ $\Sigma = 1986$ cfs

BY RLS DATE 10/23/80 BERGER ASSOCIATES SHEET NO. 6 OF 7
CHKD. BY DATE 11/7/80 PROJECT D0590
SUBJECT CARBAUGH RUN DAM

MAXIMUM KNOWN FLOOD AT DAMSITE

THERE ARE NO RECORDS OF POOL LEVELS FOR THIS DAM. BASED ON THE RECORDS OF THE GAGING STATION FOR CONOCOCHEAQUE CREEK AT NEARBY FAYETTVILLE PA., (D.A. = 5.05 SQ. MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1972 WHEN A DISCHARGE OF 392 CFS WAS OBSERVED. THE MAXIMUM INFLOW TO CARBAUGH RUN IS ESTIMATED TO BE:

$$Q = \left(\frac{3.28}{5.05}\right)^{0.8} \times 392$$

$$= 278 \text{ CFS}$$

DESIGN FLOOD

SIZE CLASSIFICATION

MAXIMUM STORAGE = 365 ACRE-FEET
MAXIMUM HEIGHT = 36 FEET
SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION

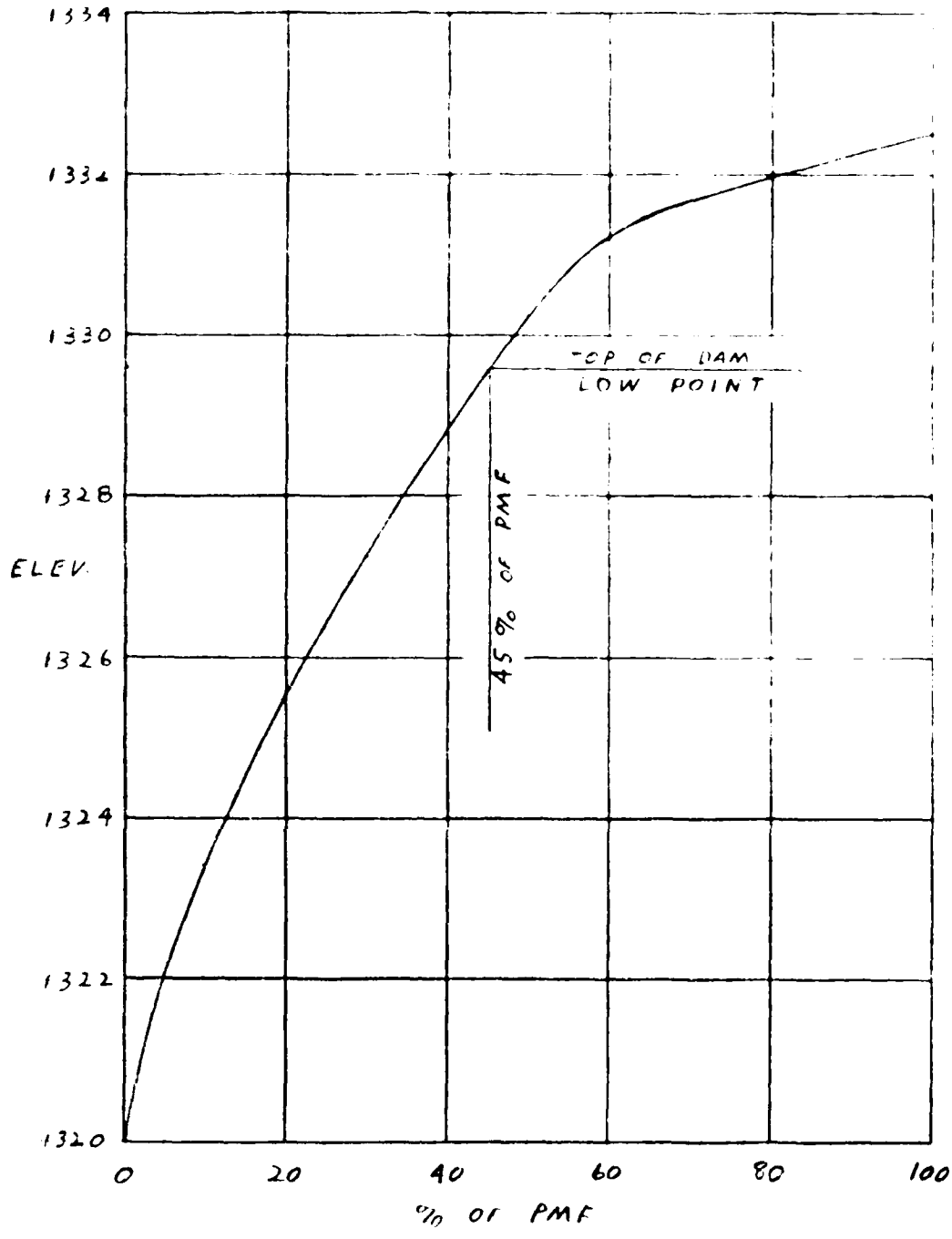
SEVERAL HOMES AND A CAMPGROUND ARE LOCATED ALONG THE CHANNEL ABOUT 3 MILES DOWNSTREAM.
USE "HIGH"

RECOMMENDED SPILLWAY DESIGN FLOOD

THE ABOVE CLASSIFICATIONS INDICATE USE OF AN SDF EQUAL TO ONE-HALF PMF TO THE FULL PROBABLE MAXIMUM FLOOD.

BY PLS DATE 11/7/81 | BERGER ASSOCIATES | SHEET NO 1 OF 7
CHKD. BY DATE | PROJECT 0570
SUBJECT ARBAUGH RUN DAM

SPILLWAY CAPACITY CURVE (EXISTING CONDITIONS)

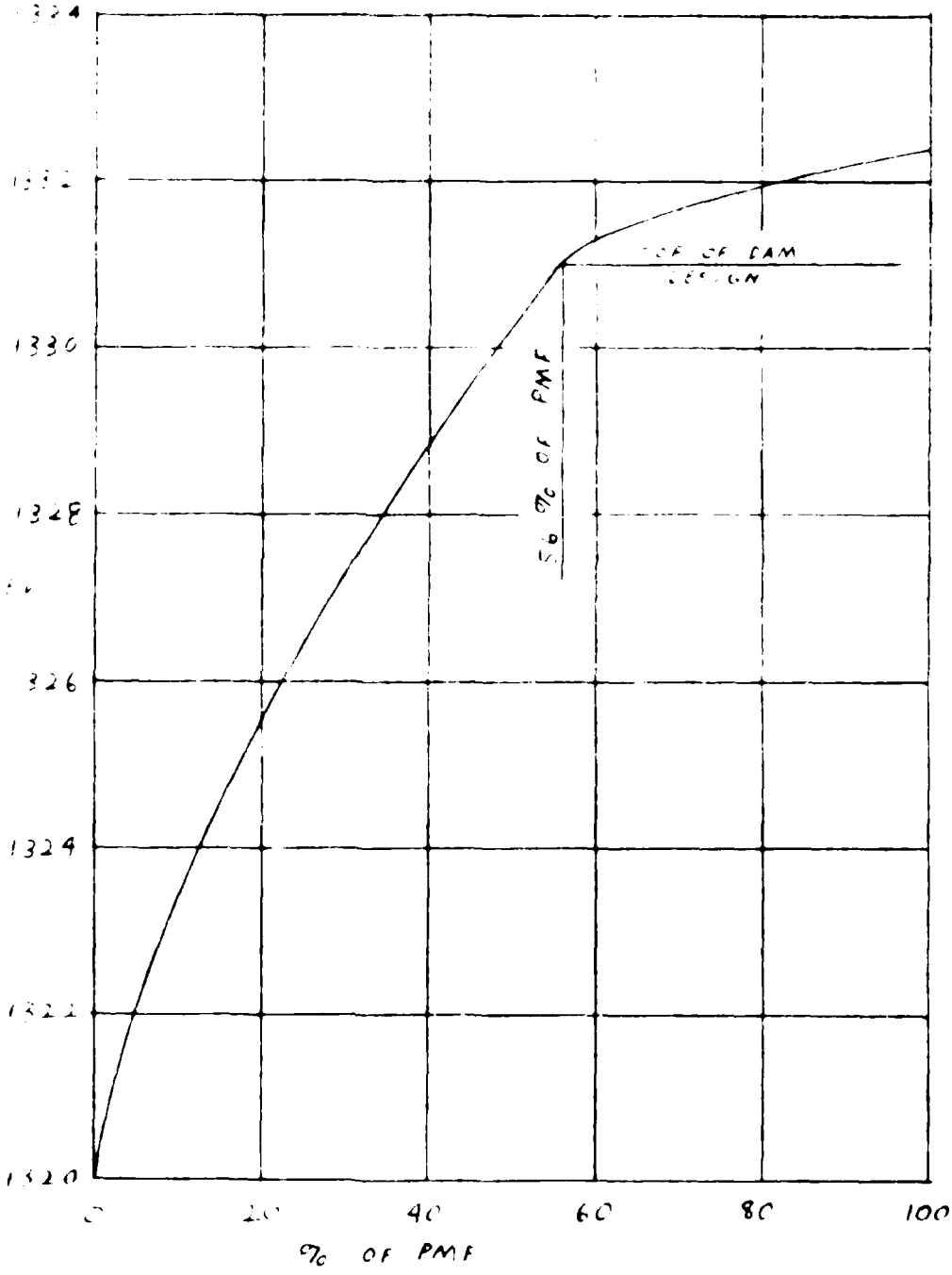


BY [illegible] DATE [illegible] **BERGER ASSOCIATES** SHEET NO. [illegible] OF [illegible]

CHKD BY DATE PROJECT DO540

SUBJECT [illegible] DAM

SPILLWAY CAPACITY CURVE (DESIGN)



HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Carbaugh Run Dam RIVER BASIN: Potomac

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.7 INCHES/24 HOURS (1)

(FOR FOOTNOTES SEE NEXT PAGE)

STATION		1	2	3	4
STATION DESCRIPTION		South Mountain Reservoir	Carbaugh Run Dam		
DRAINAGE AREA (SQUARE MILES)		3.28			
CUMULATIVE DRAINAGE AREA (SQUARE MILE)		3.28	3.28		
ADJUSTMENT OF PMP FOR DRAINAGE AREA (%) (2)	6 HOURS	113			
	12 HOURS	123			
	24 HOURS	132			
	48 HOURS	142			
	72 HOURS	---			
	Zone 6				
SNYDER HYDROGRAPH PARAMETERS	ZONE (3)	32			
	C_p / C_t (4)	.75/1.9			
	L (MILES) (5)	2.10			
	L_{ca} (MILES) (5)	.67			
	$T_p = C_t (L \cdot L_{ca})^{0.3}$ (Hours)	2.10			
SPILLWAY DATA	CREST LENGTH (FT.)		40		
	FREEBOARD (FT.)		9.6		
	DISCHARGE COEFFICIENT		3.6		
	EXPONENT		1.5		
	ELEVATION		1320		
AREA (6) (ACRES)	NORMAL POOL (1320)	19.3			
	ELEV. 1340	32.1			
	ELEV				
STORAGE (ACRE - FEET)	NORMAL POOL (7) (1320)	153			
	ELEV 1296.3 (8)	0			
	ELEV. (8)				
	ELEV (8)				

(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

(5) L = Length of longest water course from outlet to basin divide.

L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

(6) Planimetered area encompased by contour upstream of dam.

(7) PennDER files.

(8) Computed by conic method.

```
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************
    1             A1      CARBAUGH RUN DAM    ****    CARBAUGH RUN
    2             A2      FRANKLIN TWP., ADAMS COUNTY, PA.
    3             A3      NDI # PA-00881      PA DER # 1-77
    4             B    300      0      15       0       0       0       0       0      -4       0
    5             B1     5
    6             J      1      9       1
    7             J1     1    .85      .7      .6      .5      .4      .3      .2      .1
    8             K             1                                       1
    9             K1                INFLOW  HYDROGRAPH
   10             M      1      1    3.28
   11             P            23.7     113     123     132     142
   12             T                                                    1     .05
   13             W   2.10     .75
   14             X   -1.5    -.05       2
   15             K      1      2                                       1
   16             K1                RESERVOIR  ROUTING
   17             Y                                1
   18             Y1     1                                            153      -1
   19             Y4  1320  1320.5    1321  1321.5    1322    1323    1324    1325    1326    1327
   20             Y4  1328    1329  1329.6    1330    1331  1331.5    1332
   21             Y5     0      51     144     265     407     748    1152    1610    2116    2667
   22             Y5  3258    3888    4283    4555    5296    6200    7972
   23             $A     0    19.3    32.1
   24             $E1296.3    1320    1340
   25             $$  1320
   26             $D1329.6
   27             K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           2
                                END OF NETWORK


1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************

 RUN  DATE= 80/11/17.
      TIME= 11.05.53.


                          CARBAUGH RUN DAM    ****    CARBAUGH RUN
                          FRANKLIN TWP., ADAMS COUNTY, PA.
                          NDI # PA-00881      PA DER # 1-77

                                        JOB SPECIFICATION
                    NO     NWR    NMIN    IDAY    IHR    IMIN   METRC    IPLT    IPRT   NSTAN
                   300       0      15       0      0       0       0       0      -4       0
                                      JOPER     NWT   LROPT   TRACE
                                          5       0       0       0


                                  MULTI-PLAN ANALYSES TO BE PERFORMED
                                      NPLAN= 1 NRTIO= 9 LRTIO= 1
                          RTIOS=   1.00    .85    .70    .60    .50    .40    .30    .20    .10
```

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JFLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.28	0.00	3.28	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	23.70	113.00	123.00	132.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .300

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.10 CP= .75 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG= 2.10 HOURS, CP= .75 VOL= 1.00

32.	118.	233.	358.	487.	609.	701.	753.	766.	740.
660.	549.	449.	367.	300.	245.	200.	164.	134.	109.
89.	73.	60.	49.	40.	33.	27.	22.	18.	15.
12.	10.	8.							

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.92	24.52	2.40	209989.
										(684.)	(623.)	(61.)	(5946.23)

********** ********** ********** ********** **********

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

RESERVOIR ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	153.	-1

STAGE	1320.00	1320.50	1321.00	1321.50	1322.00	1323.00	1324.00	1325.00	1326.00	1327.00
	1328.00	1329.00	1329.60	1330.00	1331.00	1331.50	1332.00			
FLOW	0.00	51.00	144.00	265.00	407.00	748.00	1152.00	1610.00	2116.00	2667.00
	3258.00	3888.00	4283.00	4555.00	5296.00	6200.00	7972.00			

SURFACE AREA=	0.	19.	32.
CAPACITY=	0.	152.	661.
ELEVATION=	1296.	1320.	1340.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1320.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1329.6	0.0	0.0	0.

PEAK OUTFLOW IS 9829. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 8355. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 6876. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 5839. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 4746. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 3776. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 2820. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 1868. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 918. AT TIME 42.25 HOURS

********** ********** ********** ********** **********

1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	RATIO 2 .85	RATIO 3 .70	RATIO 4 .60	RATIO 5 .50	RATIO 6 .40	RATIO 7 .30	RATIO 8 .20	RATIO 9 .10
HYDROGRAPH AT	1	3.28	1	9840.	8364.	6888.	5904.	4920.	3936.	2952.	1968.	984.
	(	8.50)	(	278.63)(	236.84)(	195.04)(	167.18)(	139.32)(	111.45)(	83.59)(	55.73)(	27.86)
ROUTED TO	2	3.28	1	9829.	8355.	6876.	5839.	4746.	3776.	2820.	1868.	918.
	(	8.50)	(	278.34)(	236.59)(	194.69)(	165.35)(	134.40)(	106.93)(	79.86)(	52.90)(	25.99)

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1320.02	1320.00	1329.60
STORAGE	153.	152.	365.
OUTFLOW	2.	0.	4283.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1332.52	2.92	441.	9829.	4.50	41.75	0.00
.85	1332.11	2.51	430.	8355.	4.00	41.75	0.00
.70	1331.69	2.09	418.	6876.	3.00	41.75	0.00
.60	1331.30	1.70	408.	5839.	2.50	42.00	0.00
.50	1330.26	.66	381.	4746.	1.50	42.00	0.00
.40	1328.82	0.00	345.	3776.	0.00	42.00	0.00
.30	1327.26	0.00	308.	2820.	0.00	42.25	0.00
.20	1325.51	0.00	268.	1868.	0.00	42.25	0.00
.10	1323.42	0.00	222.	918.	0.00	42.25	0.00

EOI ENCOUNTERED.
N>

```
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************
     1            A1      CARBAUGH RUN DAM    ****    CARBAUGH RUN
     2            A2      FRANKLIN TWP., ADAMS COUNTY, PA.
     3            A3      NDI # PA-00881      PA DER # 1-77
     4            B    300      0      15       0       0       0       0       0      -4       0
     5            B1     5
     6            J      1      9       1
     7            J1     1    .85      .7      .6      .5      .4      .3      .2      .1
     8            K             1                                      1
     9            K1                INFLOW  HYDROGRAPH
    10            M      1       1    3.28
    11            P             23.7     113     123     132     142
    12            T                                                    1     .05
    13            W    2.10     .75
    14            X    -1.5    -.05       2
    15            K      1       2                                      1
    16            K1                RESERVOIR  ROUTING
    17            Y                                 1
    18            Y1     1                                           153
    19            $A     0    19.3    32.1
    20            $E1296.3    1320    1340
    21            $$  1320      40     3.6     1.5
    22            $D  1331     2.7     1.5     800
    23            K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           2
                                END OF NETWORK


1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************

 RUN  DATE# 81/01/06.
      TIME# 05.50.54.


                    CARBAUGH RUN DAM    ****    CARBAUGH RUN
                    FRANKLIN TWP., ADAMS COUNTY, PA.
                    NDI # PA-00881      PA DER # 1-77

                                    JOB SPECIFICATION
                  NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
                 300       0      15       0       0       0       0       0      -4       0
                                      JOPER     NWT   LROPT   TRACE
                                          5       0       0       0


                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                    NPLAN= 1 NRTIO= 9 LRTIO= 1
                          RTIOS=   1.00    .85    .70    .60    .50    .40    .30    .20    .10
```

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.28	0.00	3.28	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	23.70	113.00	123.00	132.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .600

LOSS DATA

LROPT	STRKR	DLTKR	RTIDL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.10 CP= .75 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG= 2.10 HOURS, CP= .75 VOL= 1.00

32.	118.	233.	358.	487.	609.	701.	753.	766.	740.
660.	549.	449.	367.	300.	245.	200.	164.	134.	109.
89.	73.	60.	49.	40.	33.	27.	22.	18.	15.
12.	10.	8.							

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.92	24.52	2.40	209999.
										(684.)	(623.)	(61.)	(5946.23)

********** ********** ********** ********** **********

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

RESERVOIR ROUTING -

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	153.	0

SURFACE AREA=	0.	19.	32.
CAPACITY=	0.	152.	661.
ELEVATION=	1296.	1320.	1340.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1320.0	40.0	3.6	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1331.0	2.7	1.5	800.

PEAK OUTFLOW IS 9836. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 8358. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 6877. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 5848. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 4738. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 3777. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 2820. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 1868. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 916. AT TIME 42.25 HOURS

1 ********** ********** ********** ********** **********

********** ********** ********** ********** **********

1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	RATIO 2 .85	RATIO 3 .70	RATIO 4 .60	RATIO 5 .50	RATIO 6 .40	RATIO 7 .30	RATIO 8 .20	RATIO 9 .10
HYDROGRAPH AT	1	3.28	1	9840.	8364.	6888.	5904.	4920.	3936.	2952.	1968.	984.
	(	8.50)	(	278.63)(	236.84)(	195.04)(	167.18)(	139.32)(	111.45)(	83.59)(	55.73)(	27.86)
ROUTED TO	2	3.28	1	9836.	8358.	6877.	5848.	4738.	3777.	2820.	1868.	916.
	(	8.50)	(	278.53)(	236.67)(	194.74)(	165.60)(	134.16)(	106.95)(	79.85)(	52.88)(	25.95)

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

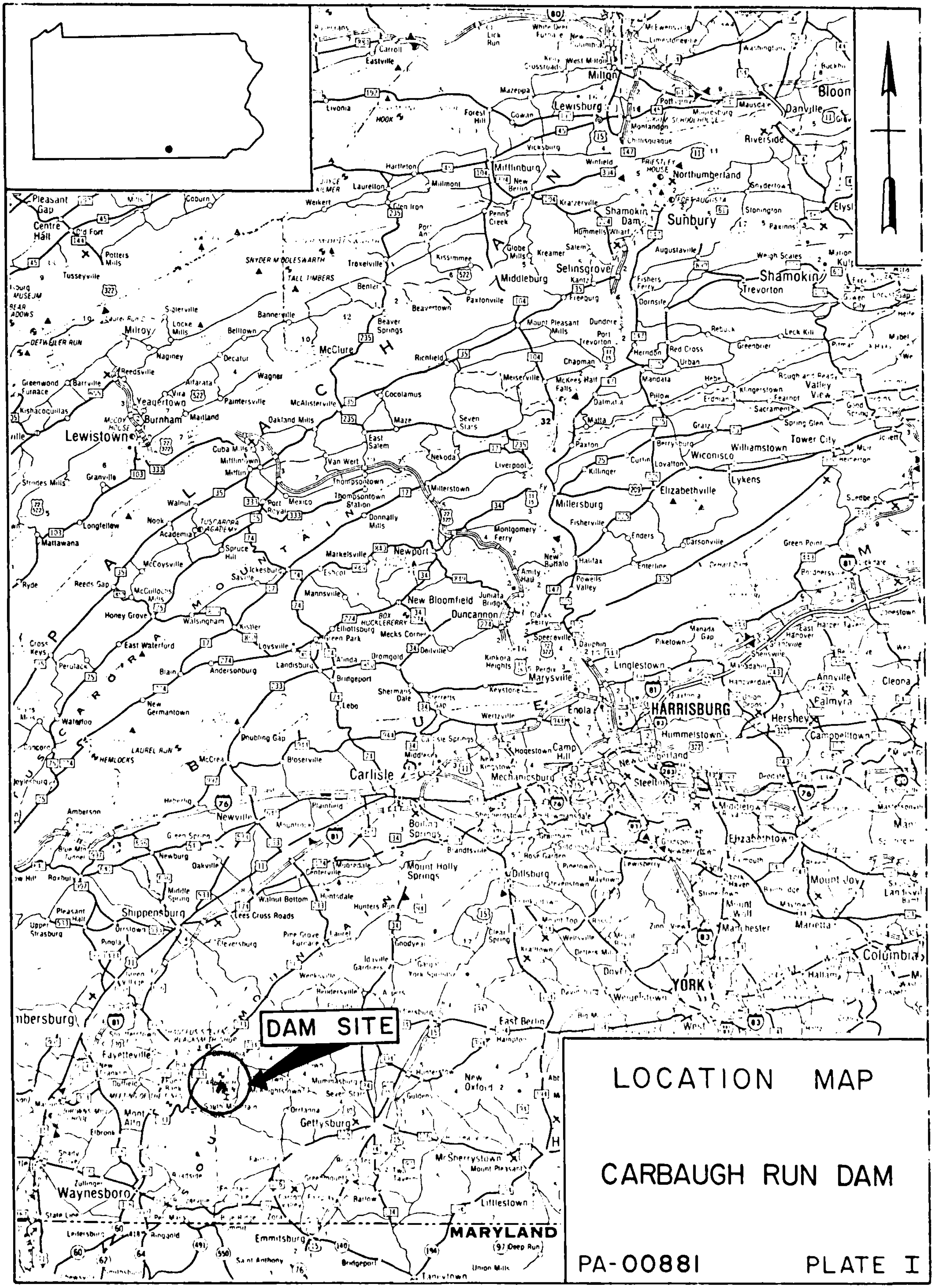
	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1320.02	1320.00	1331.00
STORAGE	153.	152.	400.
OUTFLOW	0.	0.	5254.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1332.39	1.39	437.	9836.	3.75	41.75	0.00
.85	1332.05	1.05	428.	8358.	2.75	41.75	0.00
.70	1331.66	.66	418.	6877.	2.25	41.75	0.00
.60	1331.31	.31	408.	5848.	1.25	42.00	0.00
.50	1330.27	0.00	382.	4738.	0.00	42.00	0.00
.40	1328.83	0.00	346.	3777.	0.00	42.00	0.00
.30	1327.27	0.00	308.	2820.	0.00	42.25	0.00
.20	1325.52	0.00	268.	1868.	0.00	42.25	0.00
.10	1323.43	0.00	222.	916.	0.00	42.25	0.00

EOI ENCOUNTERED.
N>

APPENDIX E

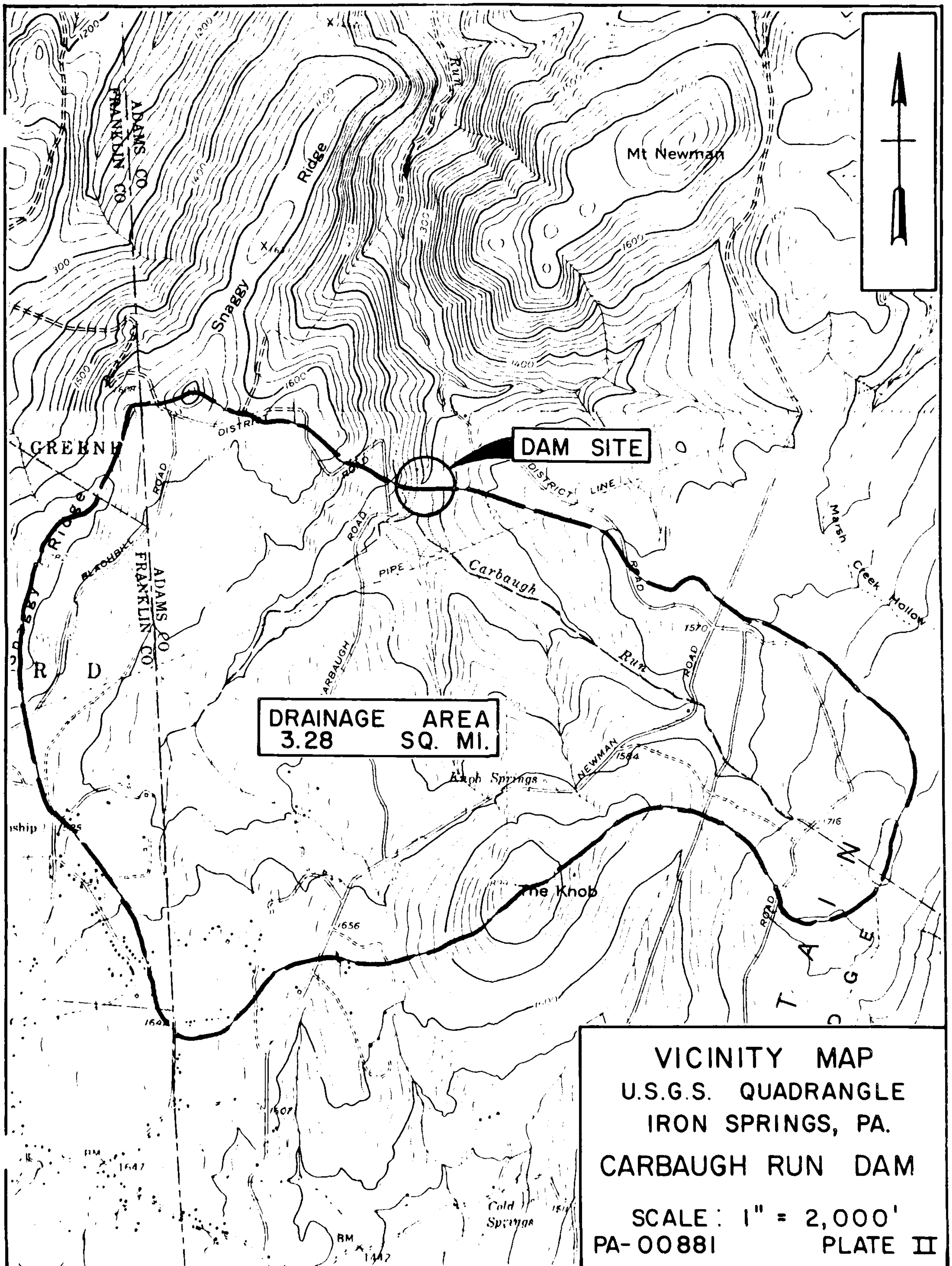
PLATES



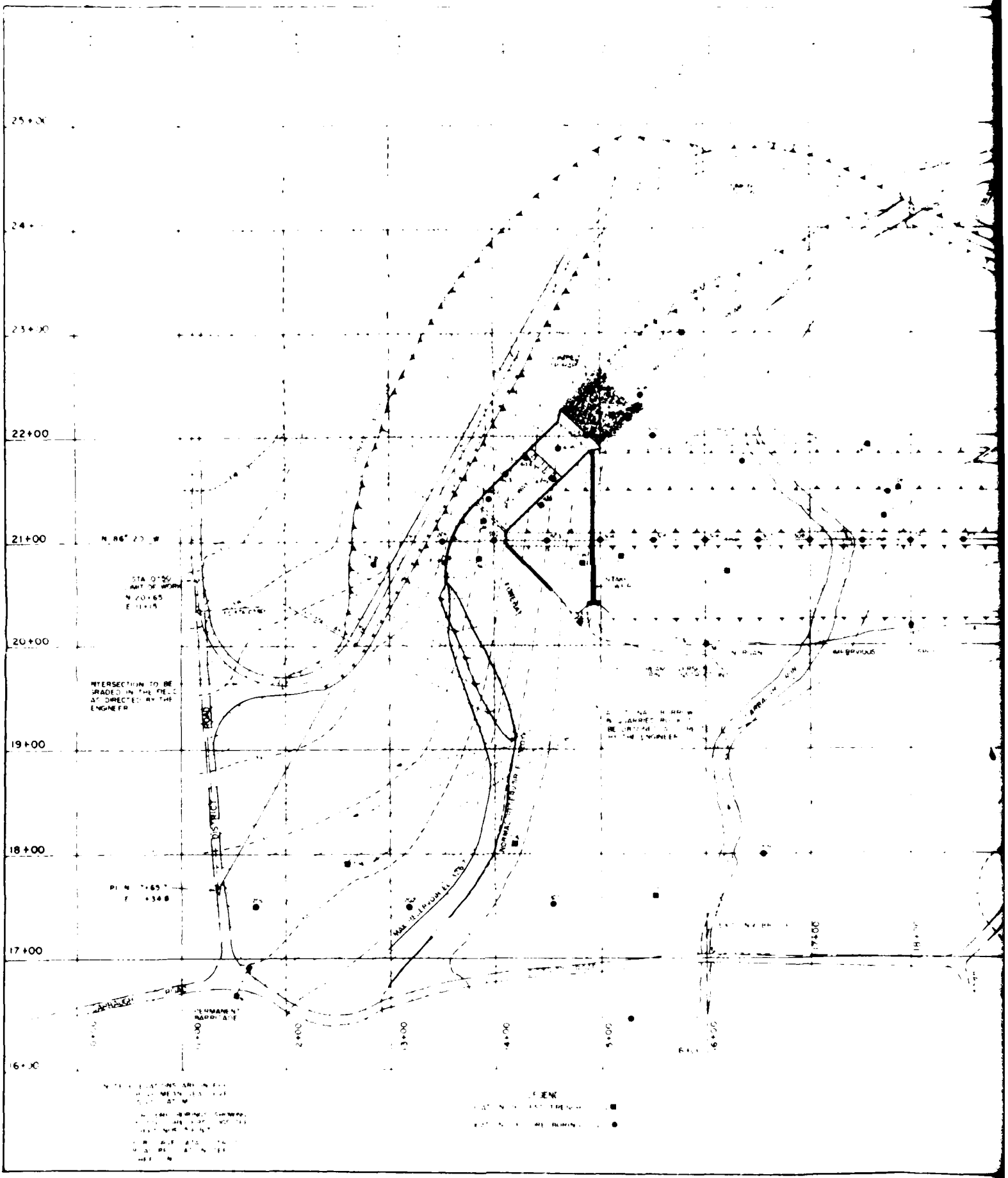
LOCATION MAP

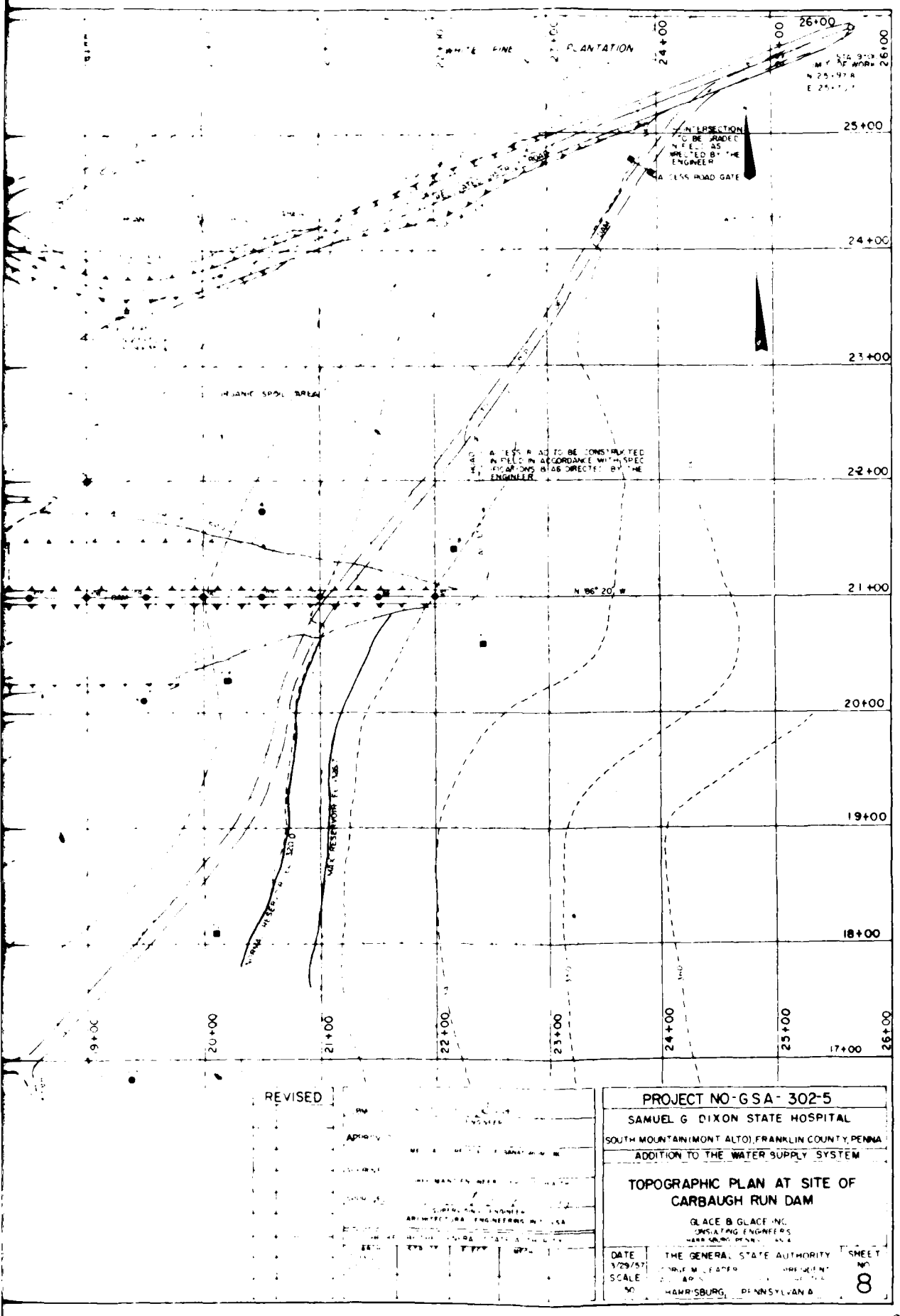
CARBAUGH RUN DAM

PA-00881 PLATE I



VICINITY MAP
U.S.G.S. QUADRANGLE
IRON SPRINGS, PA.
CARBAUGH RUN DAM
SCALE: 1" = 2,000'
PA-00881 PLATE II


25+00
24+
23+00
22+00
21+00
20+00
19+00
18+00
17+00
16+00
INTERSECTION TO BE
GRADED IN THE FIELD
AS DIRECTED BY THE
ENGINEER
ROAD
PERMANENT
RAPID ATE
LEGEND



PROJECT NO-GSA-302-5

SAMUEL G DIXON STATE HOSPITAL

SOUTH MOUNTAIN(MONT ALTO), FRANKLIN COUNTY, PENNA

ADDITION TO THE WATER SUPPLY SYSTEM

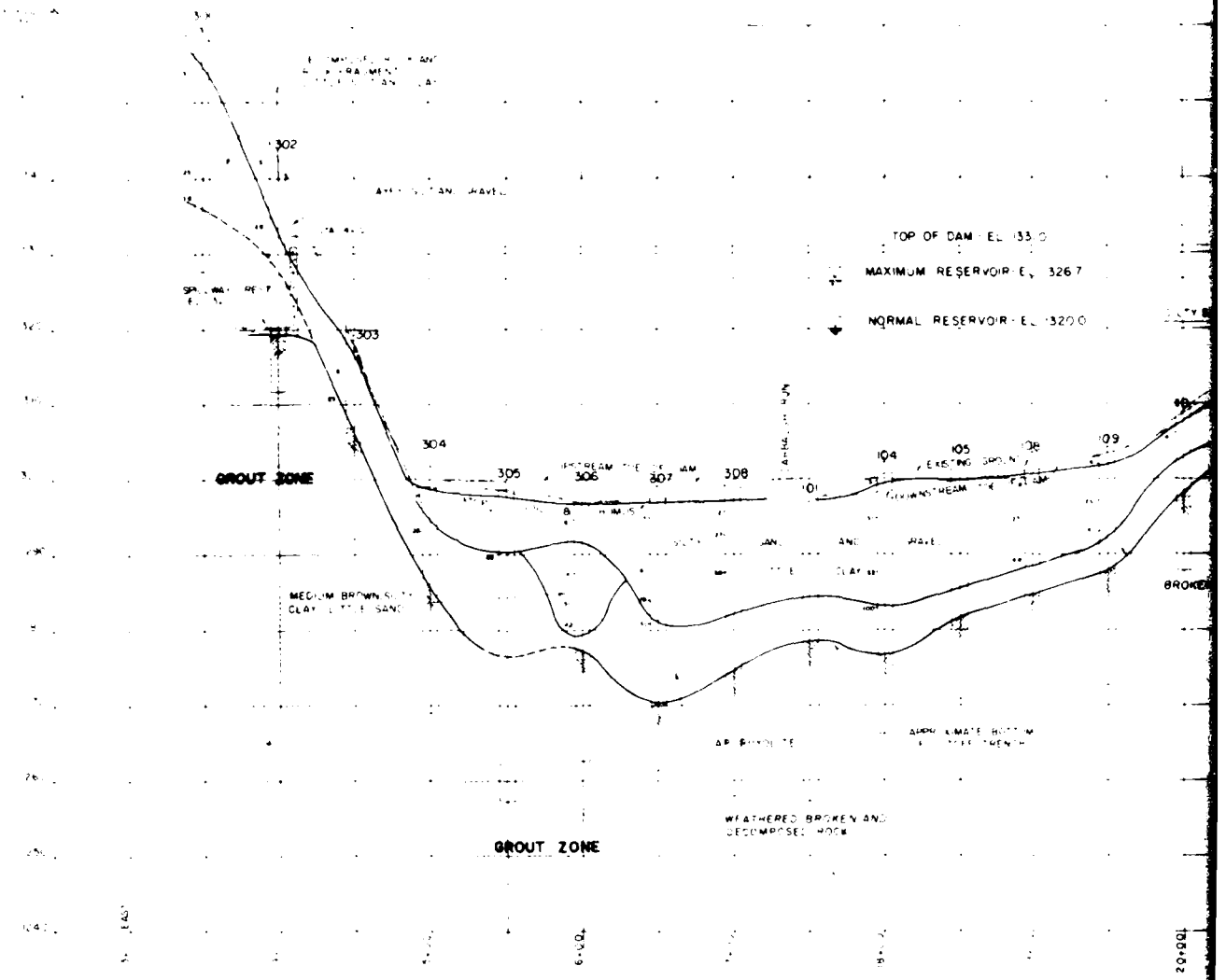
TOPOGRAPHIC PLAN AT SITE OF CARBAUGH RUN DAM

GLACE & GLACE INC.
CONSULTING ENGINEERS

DATE	THE GENERAL STATE AUTHORITY	SHEET NO
3/29/57		8
SCALE	HARRISBURG, PENNSYLVANIA	

PA-00881
PLATE III

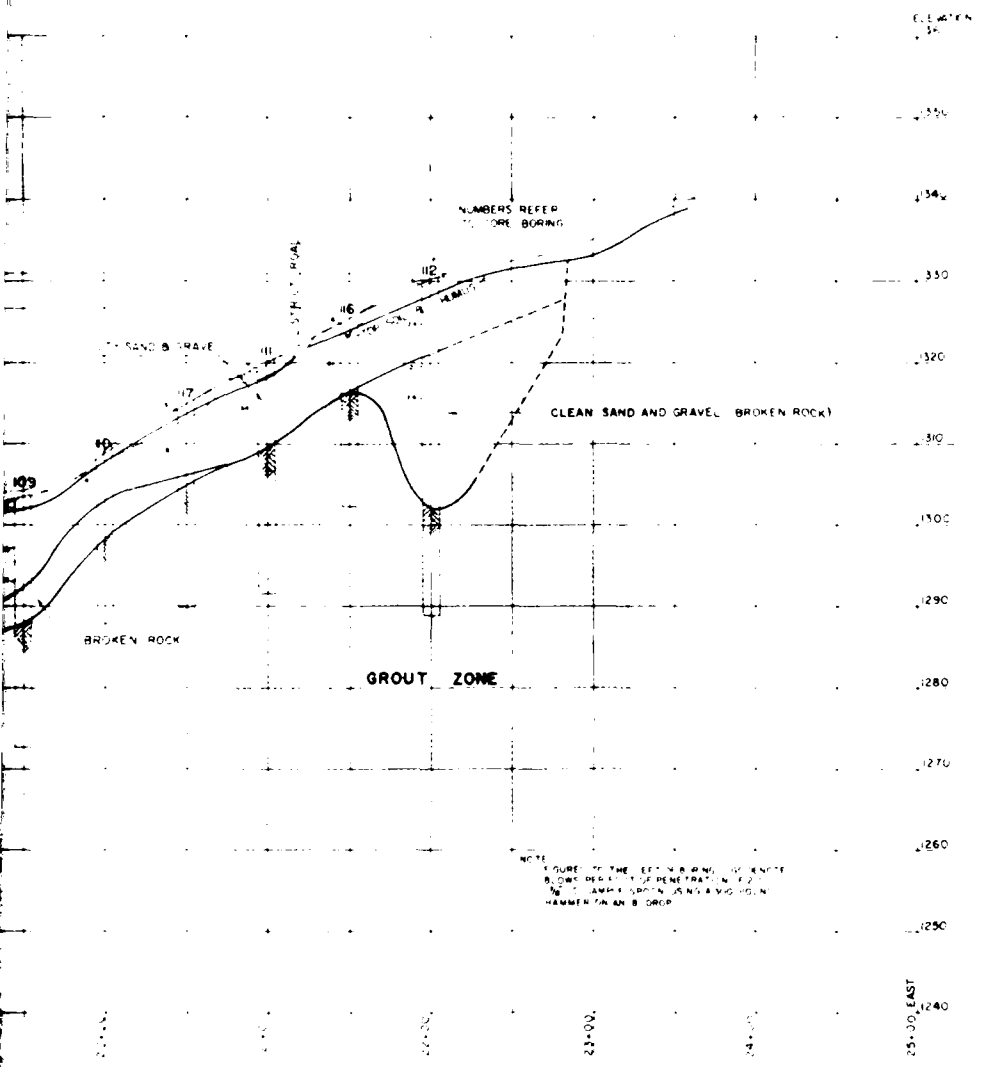
2



℄ PROFILE AT SITE OF DAM
STA 21+00 - NORTH

NOTE

Grout zone locations are approximate only and shall be approved by the Engineer during Construction



NOTE FOR CORE BORINGS SHOWING PLOTTED DRILLERS LOGS, SEE SHEET Nos 5,6 & 7

FOR LOCATION PLAN OF CORE BORINGS & TEST TRENCHES SEE SHEET Nos 4 & 8

REVISED		PROJECT NO-G.S.A-302-5
	SUBMITTED ENGINEER	SAMUEL G. DIXON STATE HOSPITAL
	APPROVED MEDICAL DIRECTOR OF SANATORIUMS NO.	SOUTH MOUNTAIN(MONT ALTO), FRANKLIN COUNTY, PENNA
	APPROVED CHIEF SANITARY ENGINEER DEPT OF HEALTH	ADDITION TO THE WATER SUPPLY SYSTEM
	APPROVED SUPERVISING ENGINEER ARCHITECTURAL ENGINEERING UNIT - G.S.A.	℄ PROFILE AT SITE OF EARTH FILL DAM ON CARBAUGH RUN
	RECOMMENDED BY THE GENERAL STATE AUTHORITY ARCH. STRUCT. ELEC. MECH.	GLACE & GLACE INC CONSULTING ENGINEERS HARRISBURG PENNSYLVANIA
		DATE 3/29/57 SCALE AS SHOWN
		THE GENERAL STATE AUTHORITY GEORGE M. LEADER PRESIDENT A. ARLOW EXEC DIRECTOR HARRISBURG, PENNSYLVANIA
		SHEET NO 9

PA-00881
PLATE IV

NOTE FOR LOCATION PLAN OF CORE BORINGS
SEE SHEET NOS 4 & 8

VICINITY OF 21+45 NORTH TO 22+0

ARBAUGH RUN

℄ OF DAM - 21+00 NORTH

ARBAUGH RUN

CORE BORINGS
BY
SPRAGUE AND HENWOOD, INC
SCRANTON, PA

H TO 22+00 NORTH

CLAY

GRAVEL

DECOMPOSED ROCK

APORHYOLITE

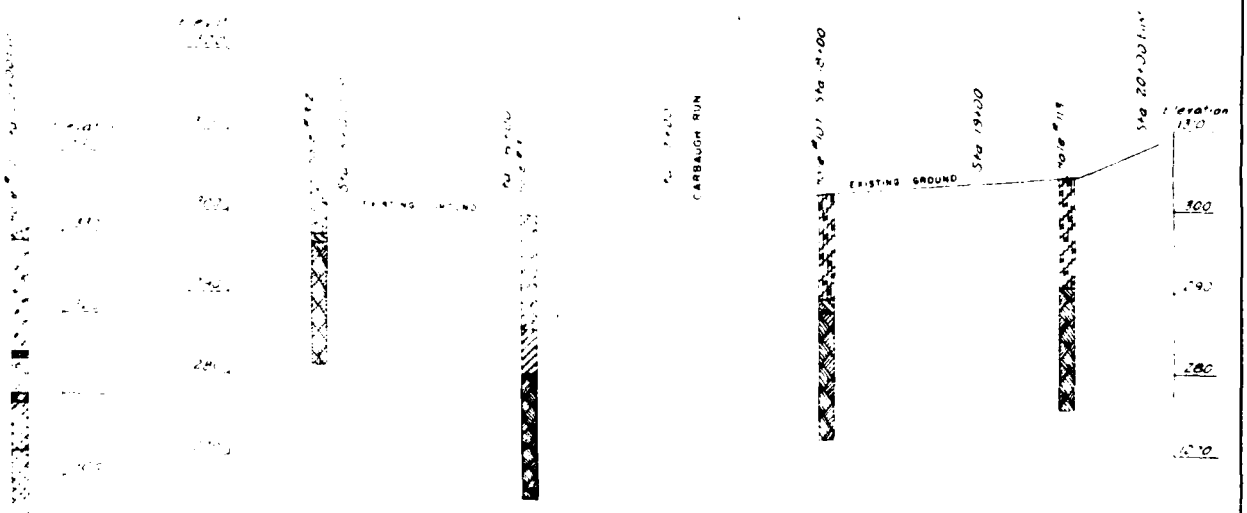
TOPSOIL

SAND

TUFF

SCHIST OR QUARTZ

VICINITY OF 20+00 NORTH 20+30 NORTH



REVISED

SUBMITTED

APPROVED

APPROVED

APPROVED

ENGINEER

SUPERVISING ENGINEER

PROJECT NO-G S A - 302-5

SAMUEL G DIXON STATE HOSPITAL

SOUTH MOUNTAIN(MONT ALTO), FRANKLIN COUNTY, PENNA

ADDITION TO THE WATER SUPPLY SYSTEM

CORE BORINGS

CARBAUGH RUN DAM SITE

GLACE & GLACE INC
CONSULTING ENGINEERS

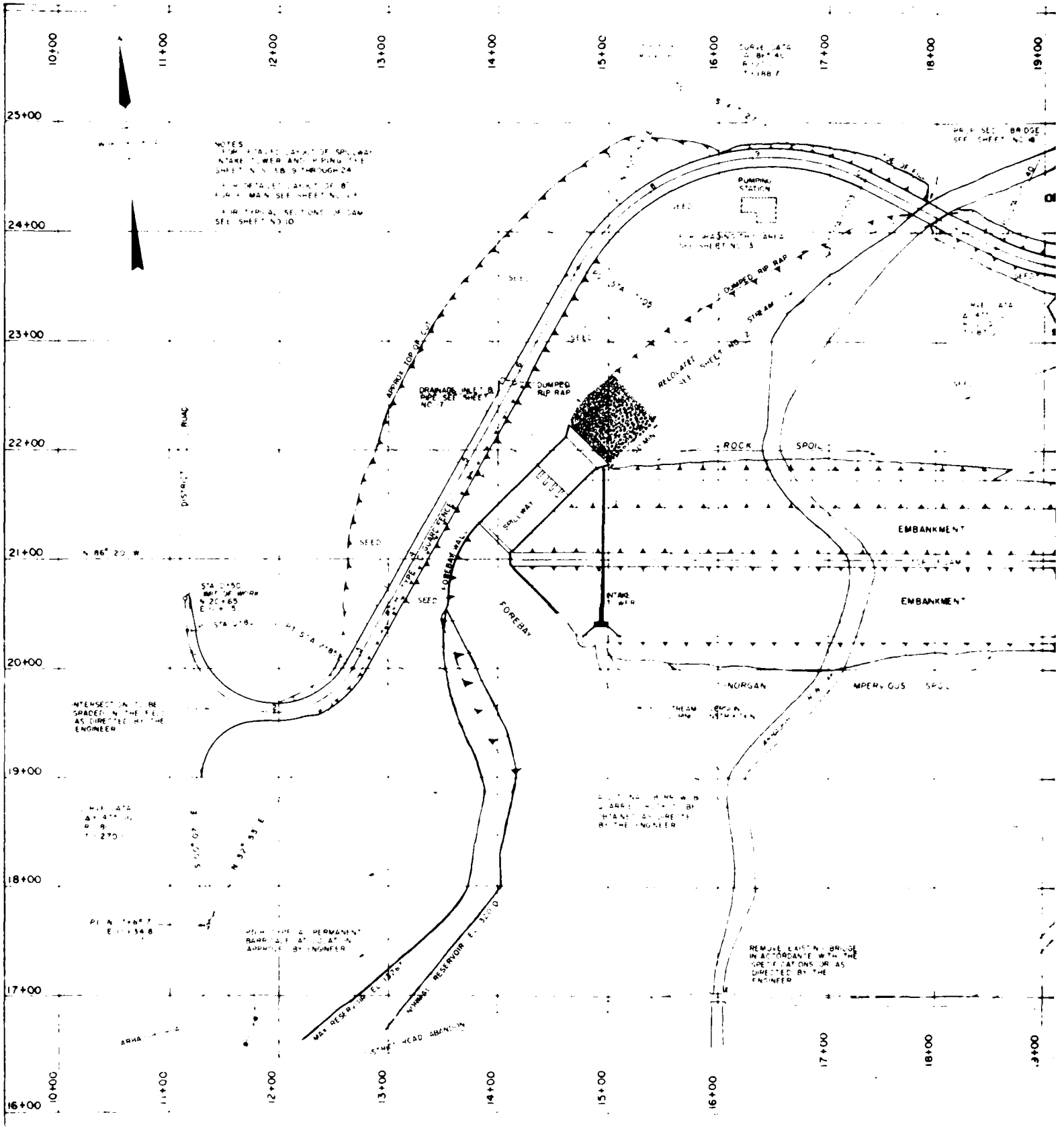
DATE

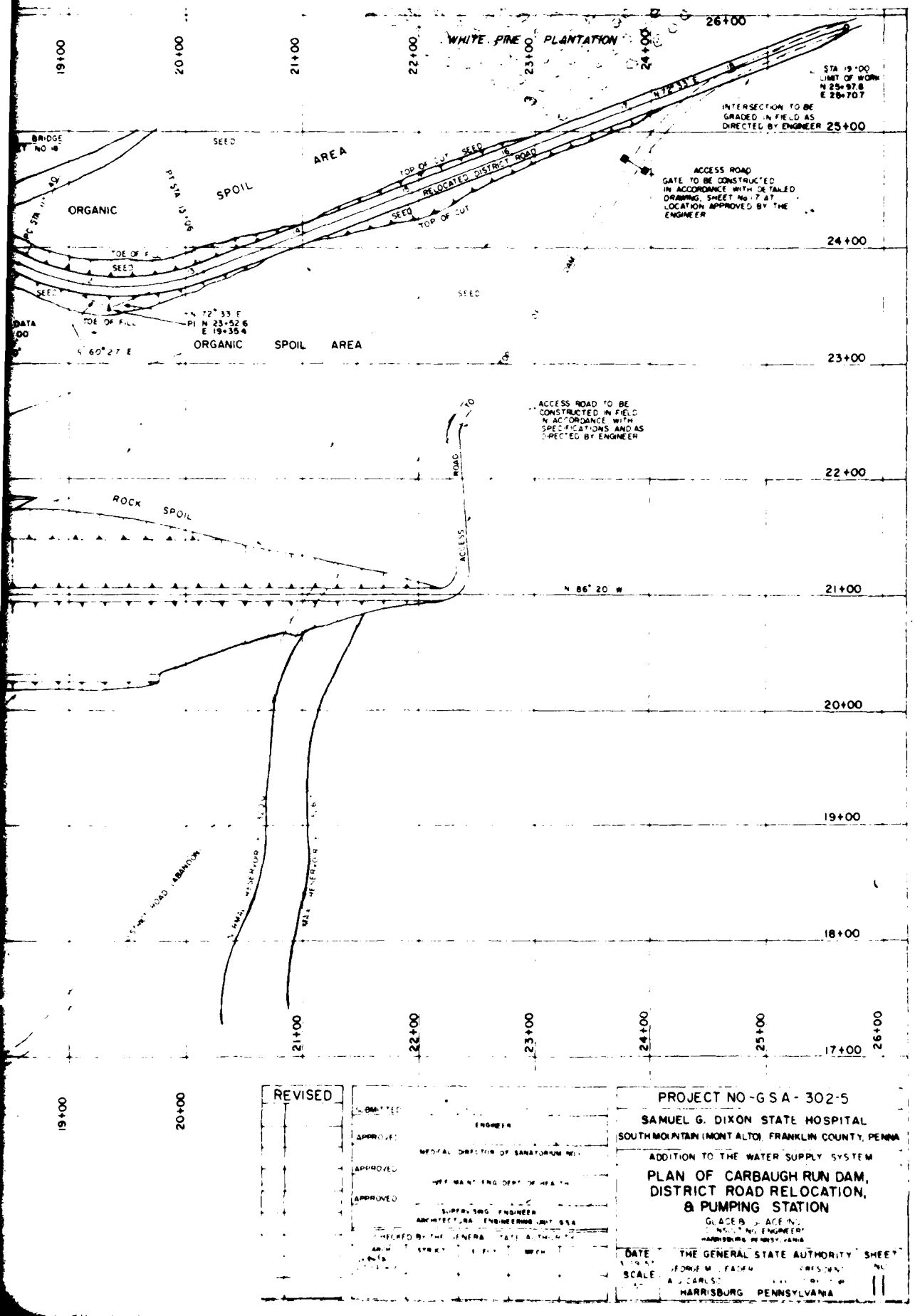
SCALE AS SHOWN

THE GENERAL STATE AUTHORITY
GEORGE M LEADER PRESIDENT
A L ARUSO EXEC DIRECTOR
HARRISBURG, PENNSYLVANIA

SHEET NO 5

PA-00881
PLATE V


10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
25+00
24+00
23+00
22+00
21+00
20+00
19+00
18+00
17+00
16+00
PUMPING STATION
DUMPED RIP RAP
STREAM
RELOCATED
ROCK
SPOIL
SPILLWAY
EMBANKMENT
EMBANKMENT
FOREBAY
SEED
DISTRICT ROAD
N 86° 20' W
N 32° 53' E
S 10° 07' E
MAX RESERVOIR EL 1270.0
NORMAL RESERVOIR EL 1260.0
REMOVE EASTERN BRIDGE IN ACCORDANCE WITH THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER



REVISED

PROJECT NO-GSA-302-5

SAMUEL G. DIXON STATE HOSPITAL

SOUTH MOUNTAIN (MONT ALTO), FRANKLIN COUNTY, PENNA.

ADDITION TO THE WATER SUPPLY SYSTEM

PLAN OF CARBAUGH RUN DAM, DISTRICT ROAD RELOCATION, & PUMPING STATION

GLACE B. ACE INC.
CONSULTING ENGINEERS
HARRISBURG, PENNSYLVANIA

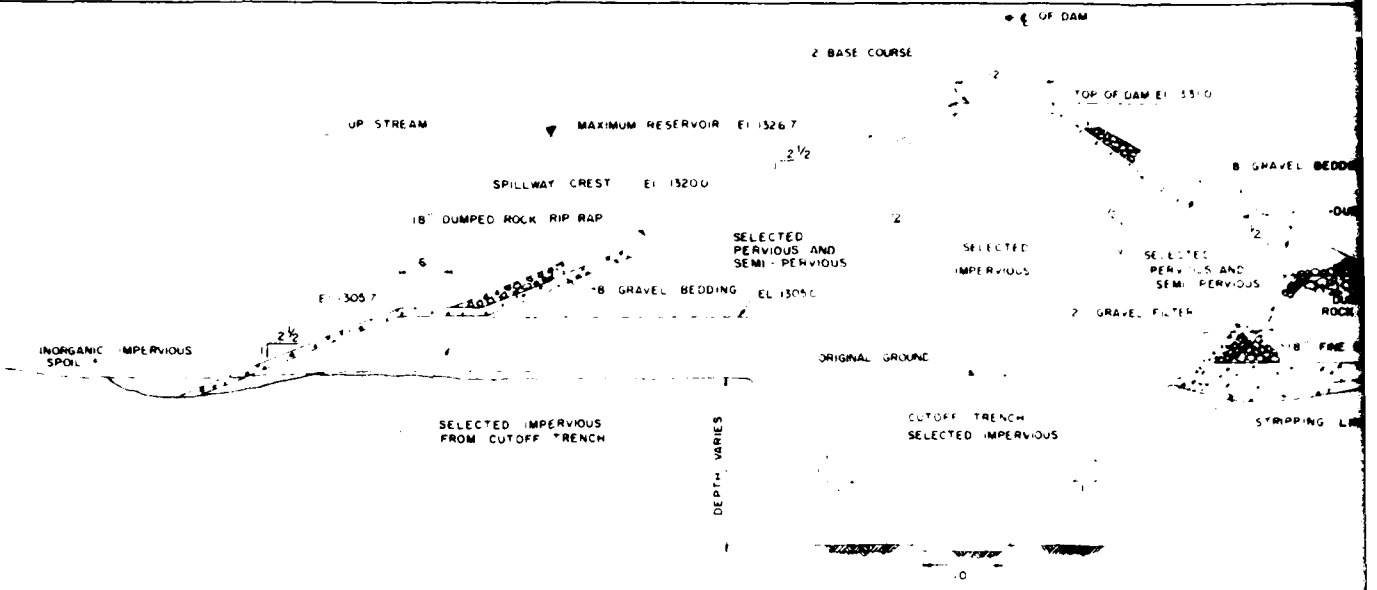
DATE

SCALE

THE GENERAL STATE AUTHORITY SHEET NO. 11

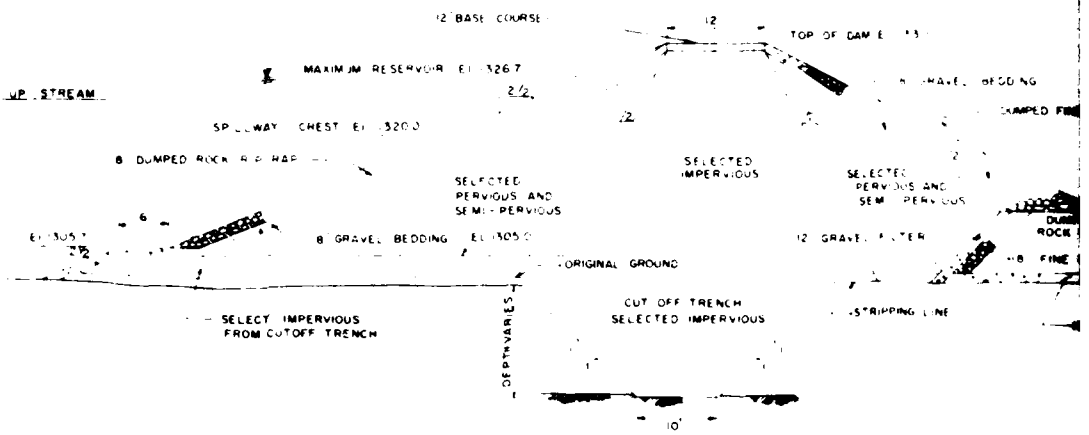
HARRISBURG PENNSYLVANIA

PA-00881
PLATE VI



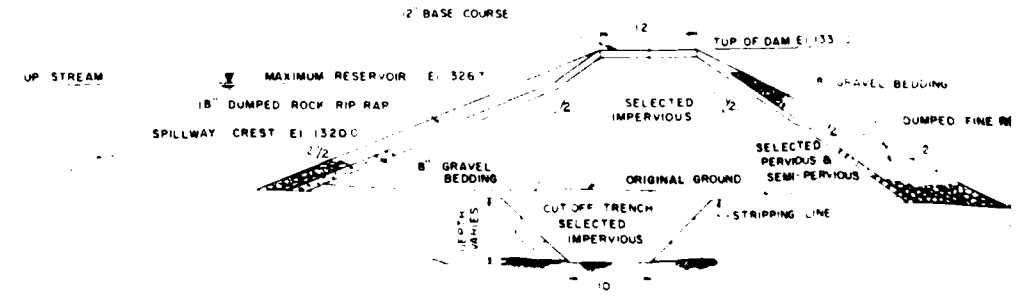
SECTION AT STA 17+00

SCALE HORZ
VERT



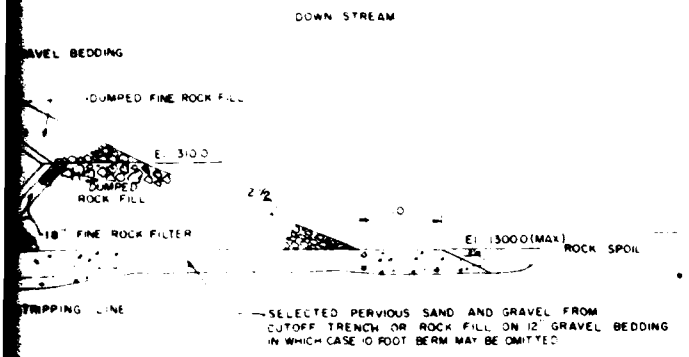
SECTION AT STA 19+50

SCALE HORZ
VERT

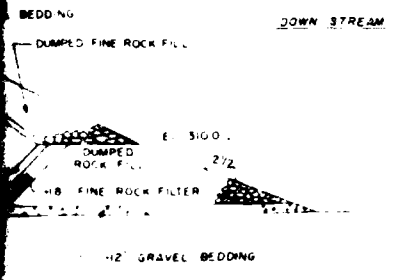


SECTION AT STA 20+50

SCALE HORZ
VERT



NOTE FOR PLAN OF CARBAUGH RUN DAM SEE SHEET NOS 8&11



REVISED

SUBMITTED ENGINEER

APPROVED MEDICAL DIRECTOR OF SANATORIUM (ACT)

APPROVED CHIEF MAINT ENGINEER DEPT OF HEALTH

APPROVED SUPERVISING ENGINEER ARCHITECTURAL ENGINEERING UNIT - GSA

CHECKED BY THE GENERAL STATE AUTHORITY
ARCH STRUCT ELECT MECH

PROJECT NO-GSA-302-5

SAMUEL G. DIXON STATE HOSPITAL

SOUTH MOUNTAIN (MONT ALTO), FRANKLIN COUNTY, PENNA.

ADDITION TO THE WATER SUPPLY SYSTEM

TYPICAL SECTIONS CARBAUGH RUN DAM

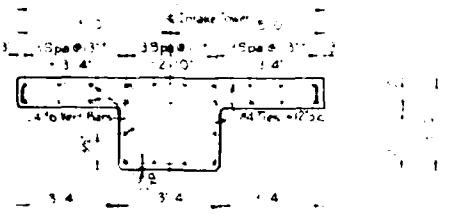
GLACE & GLACE INC
CONSULTING ENGINEERS
HARRISBURG, PENNSYLVANIA

DATE 3-29-57
SCALE AS SHOWN

THE GENERAL STATE AUTHORITY
GEORGE M. LEADER PRESIDENT
A. J. CARUSO EXEC DIRECTOR
HARRISBURG, PENNSYLVANIA

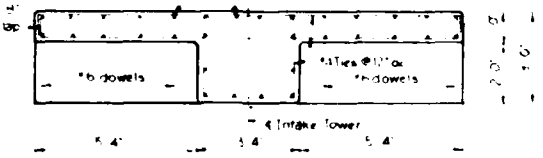
SHEET NO 10

PA-00881
PLATE VII



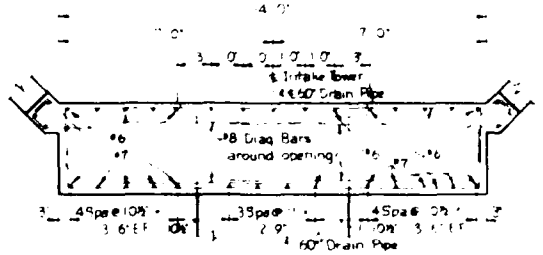
SECTION A-A

SCALE 3/8" = 1'-0"



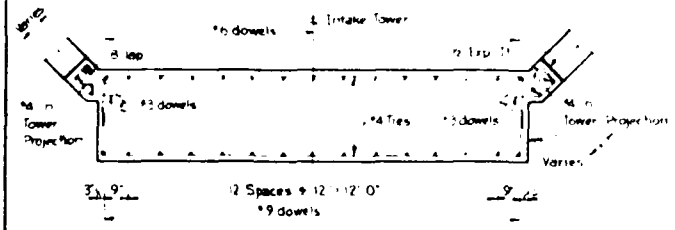
SECTION B-B

SCALE 3/8" = 1'-0"



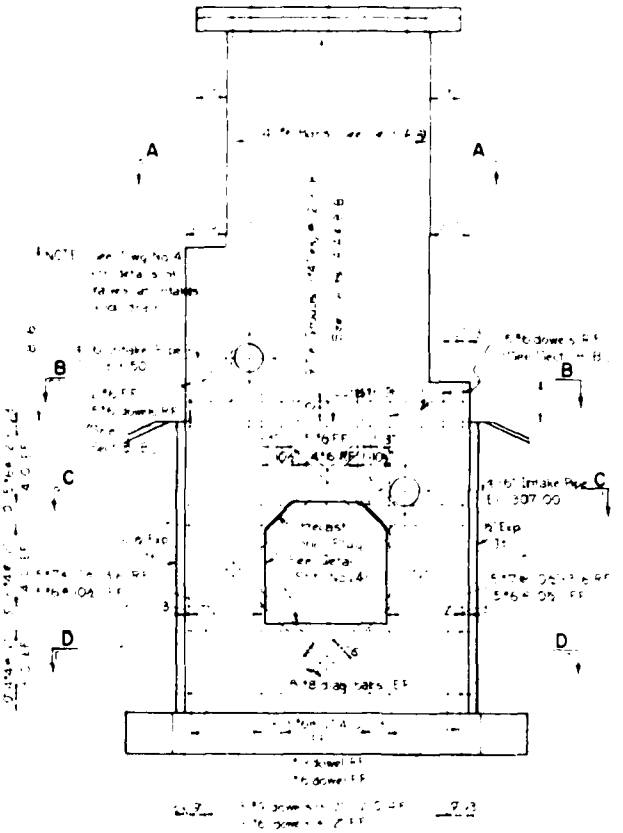
SECTION C-C

SCALE 3/8" = 1'-0"



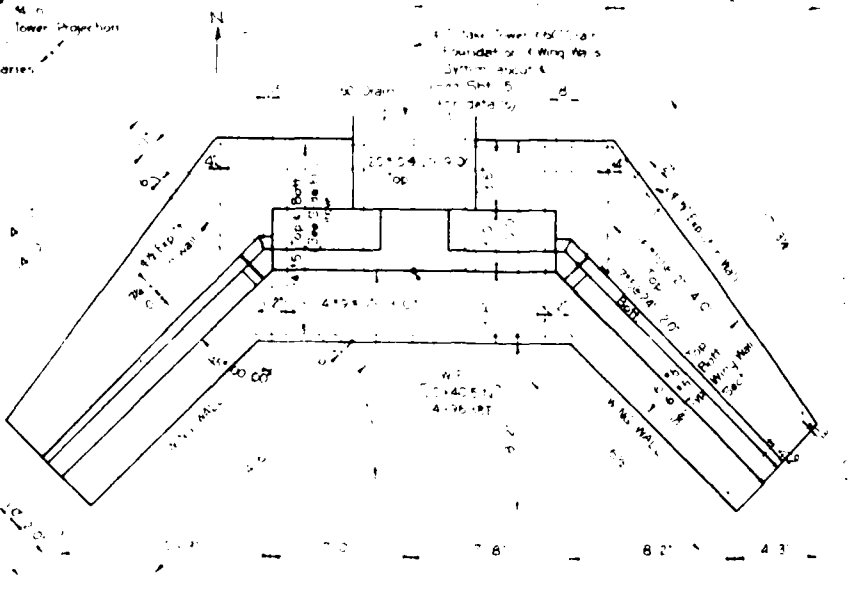
SECTION D-D

SCALE 3/8" = 1'-0"



FRONT ELEVATION
INTAKE TOWER

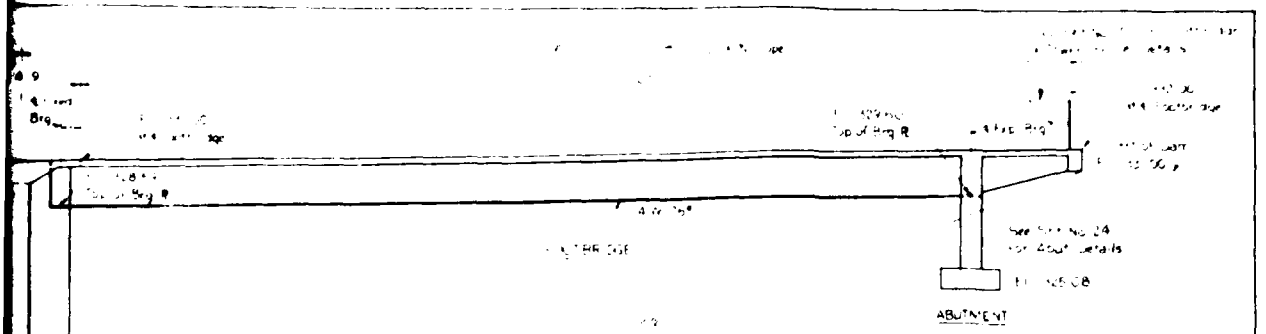
SCALE 1/4" = 1'-0"



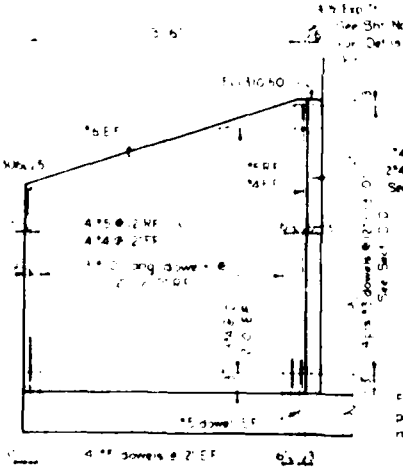
FOOTING PLAN

SCALE 1/4" = 1'-0"

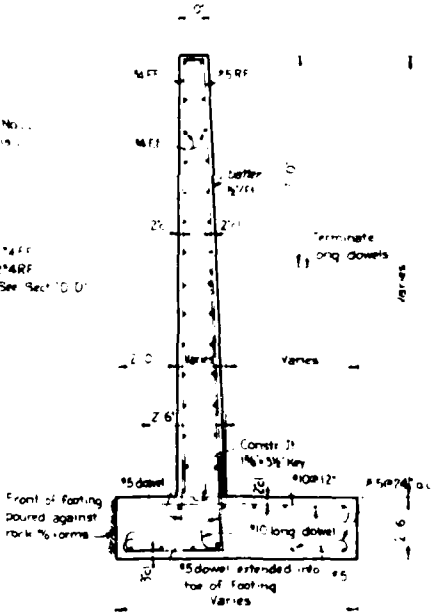
ALL DIMENSIONS & EXISTING CONDITIONS SHALL BE CHECKED & VERIFIED BY THE CONTRACTOR AT THE SITE



SIDE ELEVATION
INTAKE TOWER & FOOTBRIDGE
SCALE 1/4" = 1'-0"



WING WALL ELEVATION
BOTH WALLS IDENTICAL
SCALE 1/4" = 1'-0"



TYP WING WALL SECTION
SCALE 3/8" = 1'-0"

REVISED

SUBMITTED _____ ENGINEER
APPROVED _____ MEDICAL DIRECTOR OF SANATORIUM BD
APPROVED _____ CHIEF BUR ENG DEPT OF HEALTH
APPROVED _____ SUPERVISING ENGINEER
ARCHITECTURAL ENGINEERING UNIT GSA
CHECKED BY THE GENERAL STATE AUTHORITY

ARCH	STRUCT	ELECT	MECH

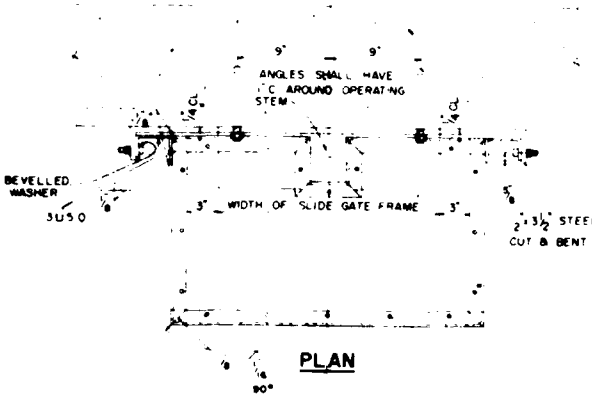
PROJECT NO- G.S.A - 302-5
SAMUEL G. DIXON STATE HOSPITAL
SOUTH MOUNTAIN (MONT ALTO), FRANKLIN COUNTY, PENNA.
ADDITION TO THE WATER SUPPLY SYSTEM

INTAKE TOWER

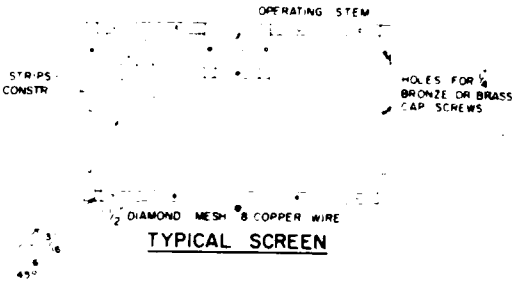
GLACE & GLACE INC
CONSULTING ENGINEERS
HARRISBURG, PENNSYLVANIA

DATE	THE GENERAL STATE AUTHORITY	SHEET NO
5 29 57	GEORGE M LEADER PRESIDENT	23
SCALE AS SHOWN	A J CARUSO EXEC DIRECTOR HARRISBURG, PENNSYLVANIA	

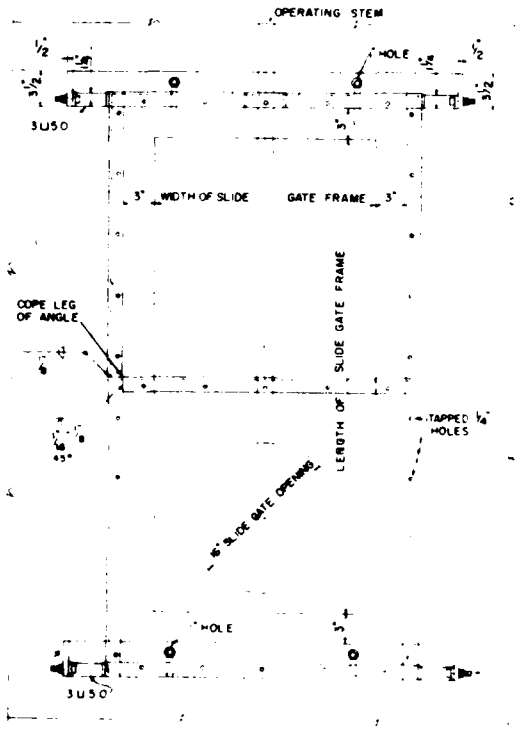
PA-00881
PLATE VIII



PLAN



TYPICAL SCREEN



FRONT ELEVATION

NOTES

1 ALL SIDES, TOP & BOTTOM SHALL HAVE SCREENS

2 SCREENS NOT SHOWN IN THESE VIEWS

3 OVERALL DIMENSIONS OF FRAME TO BE DECIDED AFTER PURCHASE OF SLIDE GATE

4 TAPPED HOLES FOR ⅛" CAP SCREWS @ 6" c/c WILL BE PROVIDED

5 FRAME TO BE FABRICATED OF 1½"x1½"x3/16" ANGLES-WELDED CONSTR

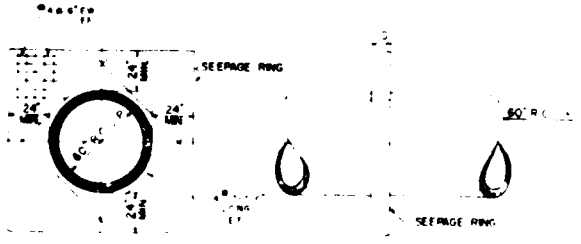
6 All WELDS SHOWN ARE TYPICAL

½" SQUARE HEAD BOLT WITH HEX NUT

SIDE ELEVATION

DETAIL OF SLIDE GATE SCREEN

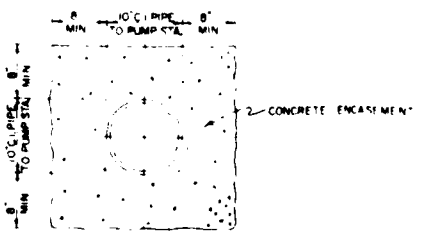
SCALE 1½"=1'-0"



FRONT ELEVATION

SIDE ELEVATION

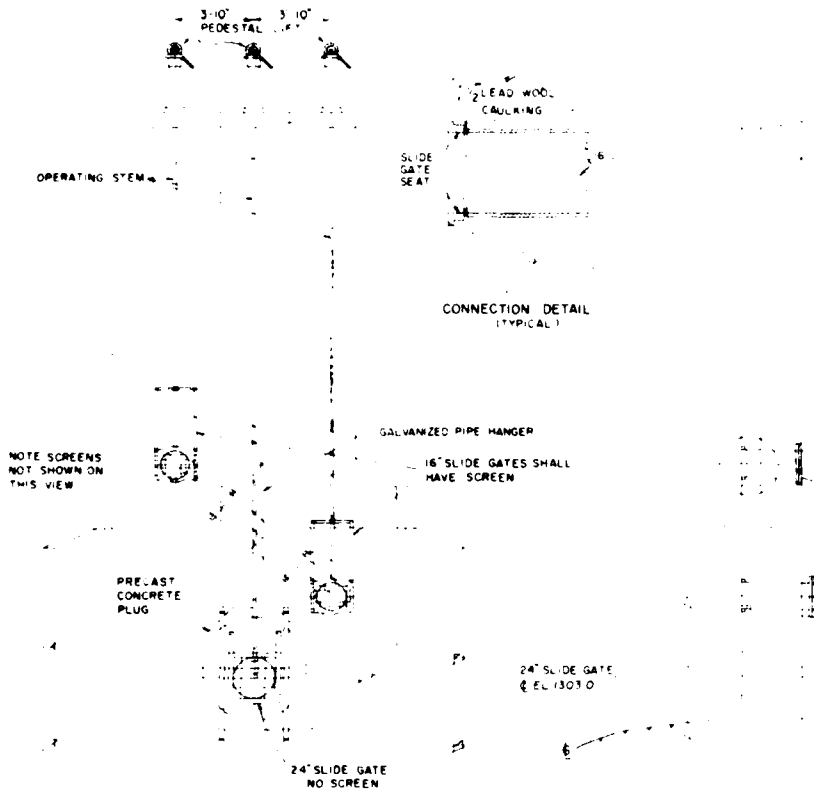
DETAIL OF SEEPAGE RING



DETAIL OF ENCASEMENT THROUGH EMBANKMENT OF DAM

SCALE 1"=1'-0"

ALL DIMENSIONS & EXISTING CONDITIONS SHALL BE CHECKED & VERIFIED BY THE CONTRACTOR AT THE SITE



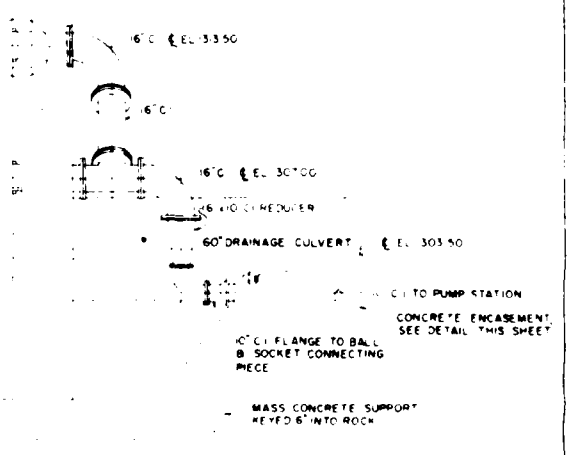
FRONT ELEVATION

NOTES

PEDESTAL LIFTS, OPERATING STEMS SLIDE GATES & SCREENS NOT SHOWN ON THIS VIEW

GALVANIZED BOLTS SHALL BE USED ON JOINTS & ALL PIPE SHALL BE PAINTED WITH BITUMASTIC OR APPROVED EQUAL

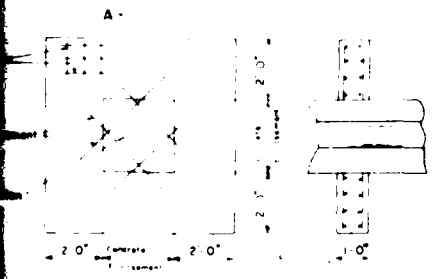
ALL FLANGED PIPING TO BE A.S.A. CLASS 125



SIDE ELEVATION

DETAIL OF PIPING AROUND INTAKE TOWER

SCALE ¼" = 1'-0"



ELEVATION A-A

SECTION A-A

DETAIL OF CONCRETE COLLAR

SCALE 3/8" = 1'-0"

REVISED

SUBMITTED _____ ENGINEER

APPROVED _____ MEDICAL DIRECTOR OF SANATORIUM NO.

APPROVED _____ CHIEF WATER ENGINEER DEPT. OF HEALTH

APPROVED _____ SUPERVISING ENGINEER ARCHITECTURAL ENGINEERING UNIT - G.S.A.

RECEIVED BY THE GENERAL STATE AUTHORITY

ARCH. _____ STRUCT. _____ ELECT. _____ MECH. _____

PROJECT NO.- G.S.A.- 302-5

SAMUEL G. DIXON STATE HOSPITAL

SOUTH MOUNTAIN (MONT ALTO) FRANKLIN COUNTY, PENNA.

ADDITION TO THE WATER SUPPLY SYSTEM

INTAKE TOWER
MISCELLANEOUS PIPING
& METAL WORK

GLACE & GLACE INC.
CONSULTING ENGINEERS
HARRISBURG, PENNSYLVANIA

DATE _____

SCALE AS SHOWN

THE GENERAL STATE AUTHORITY

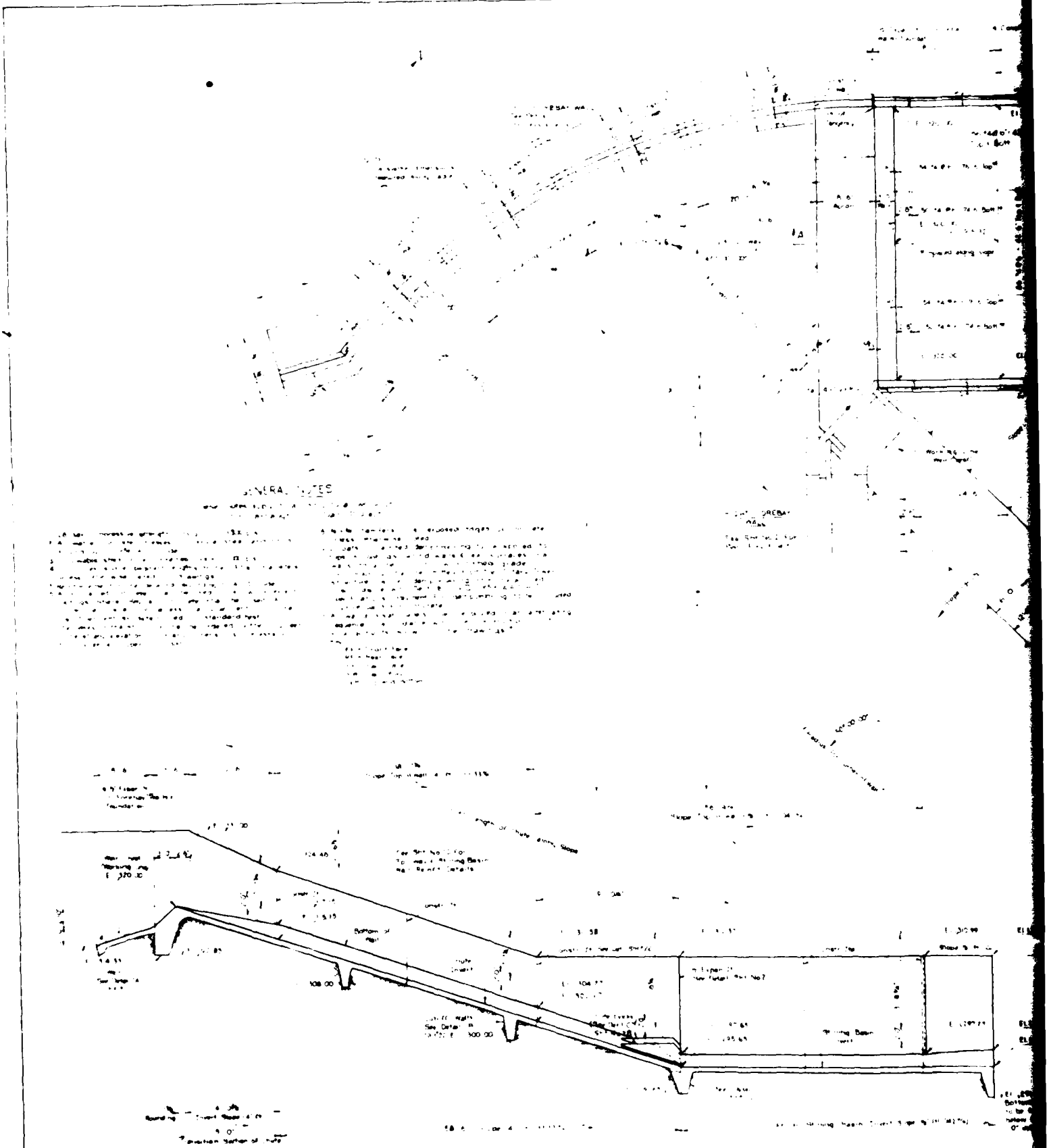
GEORGE M. FADER PRESIDENT

EXEC. DIRECTOR

HARRISBURG, PENNSYLVANIA

SHEET NO. 14

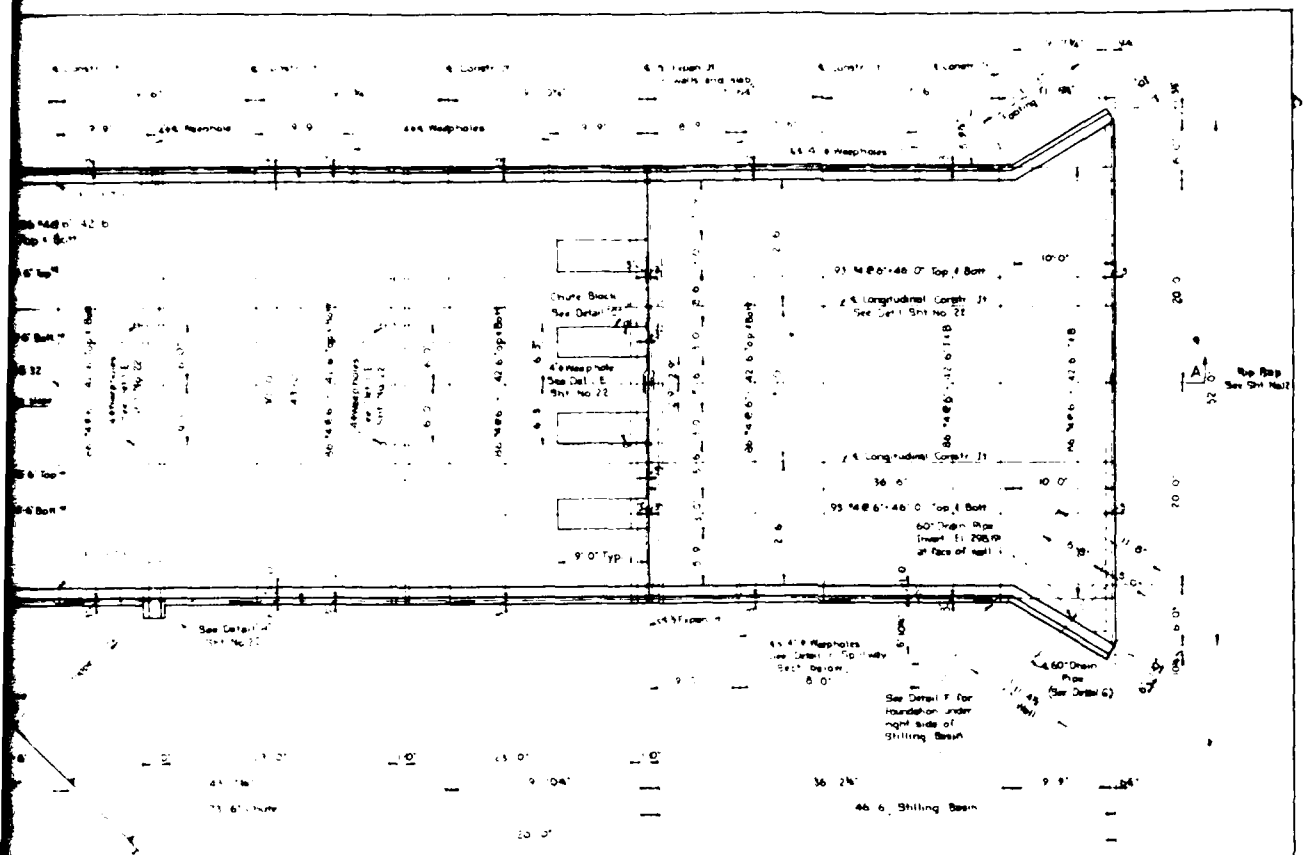
PA-00881
PLATE IX



LONGITUDINAL SECTION 'A-A'

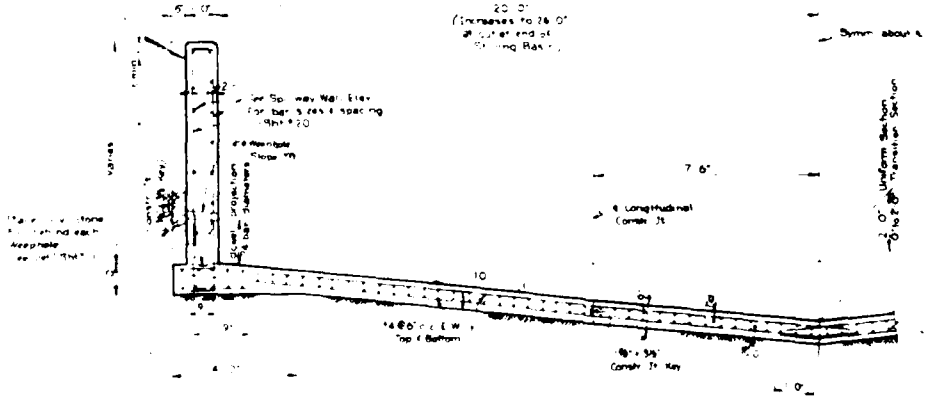
SCALE 1/8" = 1'-0"

ALL DIMENSIONS & EXISTING CONDITIONS SHALL BE CHECKED & VERIFIED BY THE CONTRACTOR AT THE SITE.



PLAN OF SPILLWAY

SCALE 1/8" = 1'-0"



HALF SECTION

SPILLWAY

SCALE 3/8" = 1'-0"

REVISED

SUBMITTED

ENGINEER

APPROVED

MEDICAL DIRECTOR OF SANATORIUM NO

APPROVED

CHIEF MAINT ENG DEPT OF HEALTH

APPROVED

SUPERVISING ENGINEER
ARCHITECTURAL ENGINEERING UNIT - G.S.A.

CHECKED BY THE GENERAL STATE AUTHORITY

ARCH	STRUCT	ELECT	MECH

PROJECT NO-G.S.A- 302-5

SAMUEL G. DIXON STATE HOSPITAL

SOUTH MOUNTAIN (MONT ALTO) FRANKLIN COUNTY, PENNA

ADDITION TO THE WATER SUPPLY SYSTEM

SPILLWAY

GLACE & GLACE INC
CONSULTING ENGINEERS
HARRISBURG, PENNSYLVANIA

DATE	THE GENERAL STATE AUTHORITY	SHEET NO
3 29 57	GEORGE M LEADER PRESIDENT	19
SCALE AS SHOWN	A J CARUSO EXEC DIRECTOR	
	HARRISBURG, PENNSYLVANIA	

PA-00881
PLATE X

APPENDIX F

GEOLOGIC REPORT

GEOLOGIC REPORT

BEDROCK - DAM AND RESERVOIR

The dam overlies two major Metarhyolite units of the Catoctin Formation. The west side of the dam overlies the Mottled Metarhyolite unit which consists of a bluish-gray to light brownish-gray metarhyolite mottled by irregular black bands with feldspar and quartz phenocrysts composing up to 8-10% of the rock. The second unit, to the east, is the Blue Metarhyolite A and it consists of undifferentiated, aphantic, flow banded, and porphyritic matarhyolite characterized by its bluish color.

STRUCTURE

The Catoctin Formation contains well developed joints, and is steeply inclined. There is an inferred dip slip fault striking diagonally N-E through the center of the dam area with the upthrown side to the north of the fault and the downthrown side to the south.

OVERBURDEN

According to available drilling logs, the overburden material consist of a silty sand and gravel with little clay ranging in depth from about 10-15 feet. Beneath this is a layer of weathered and decomposed rock with an average thickness varying from 5-10 feet.

AQUIFER CHARACTERISTICS

The Catoctin Formation is a moderately good aquifer with a secondary porosity of low magnitude. The average yield is 10 gpm. Subsurface seepage within the formation should be of little concern. However, with the possible existence of a dip slip fault, groundwater movement in the vicinity of the fault is possible.

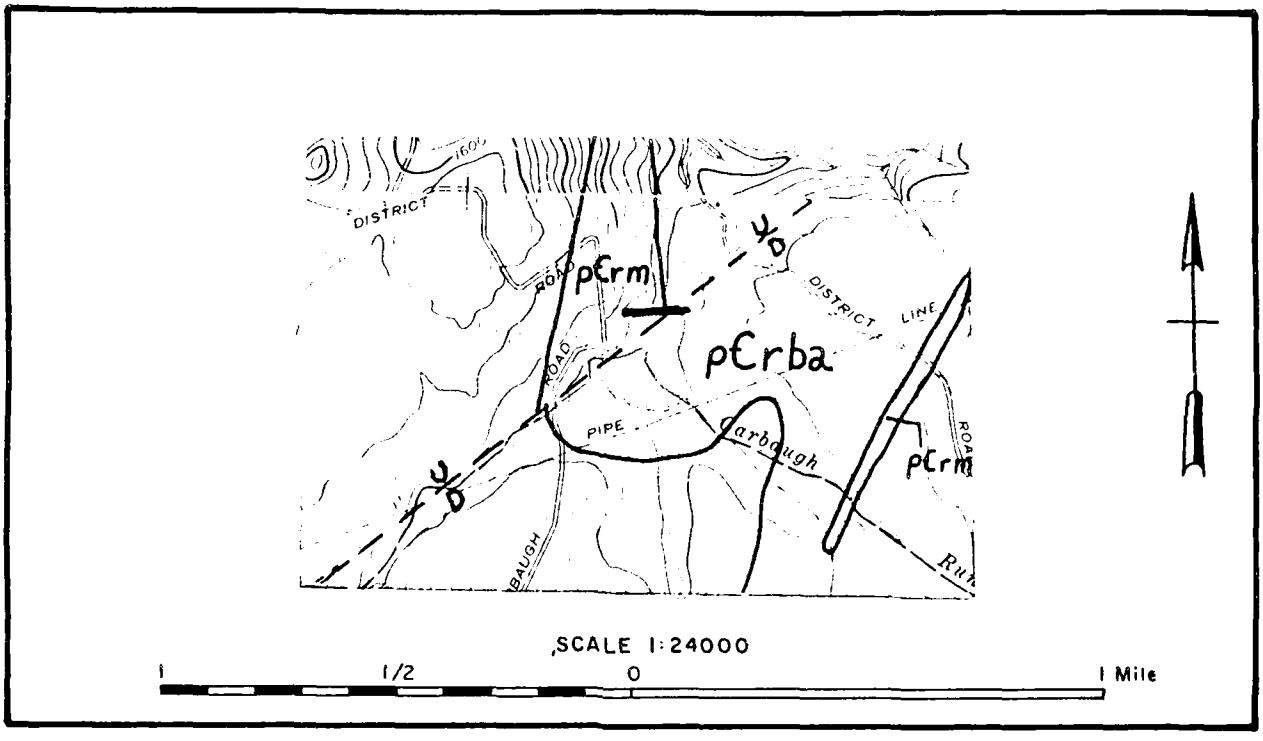
DISCUSSION

From the available construction plans, it appears that the dam cutoff trench was excavated to bedrock. The catoctin formation provides an excellent foundation base provided excavation is to sound rock.

SOURCES OF INFORMATION

1. Fauth, J.L., 1978. Geology and Mineral Resources of the Iron Springs Area, Adams and Franklin Counties, Pennsylvania: Pennsylvania Geological Survey A-129c.

GEOLOGIC MAP - CARBAUGH RUN DAM



LEGEND

pCrm	Mottled Metarhyolite
pCrba	Blue Metarhyolite
— U/D — —	Inferred Dip Slip Fault


DAT
ILM